SEPTEMBER | OCTOBER 1990 $3.50

# CB Action

AUSTRALIA'S ONLY CB MAGAZINE

## RADIO PATHS-THE LONG and the SHORT OF IT

## 'SECRET' SCANNING FREQUENCIES

## DXing THE DOCTORS

## ANTENNAS-GET IT RIGHT THE FIRST TIME

**Reviews:**

**Cobra 148GTL-27MHz**
**Panther 4-27MHz**
**IC R-1 and R-100 Receivers**
**AOR 1000 Scanner**

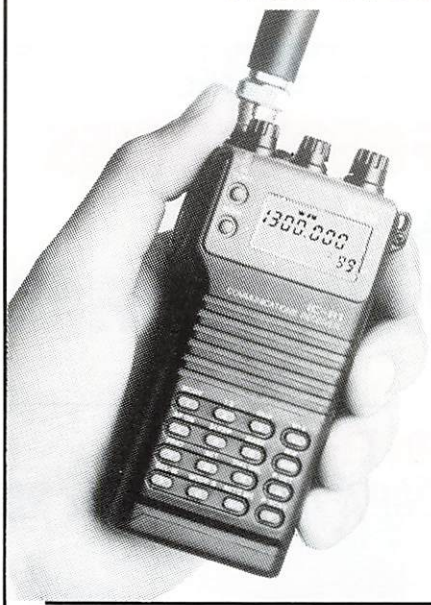
**WIN THIS**
**COBRA 148GTL 27MHz RIG!**

*all the usual columns-scanning, swl, 27MHz, DX International, DX Forecast, repeater listings...and more!*

Registered by Australia Post publication No. VBP0344

# 4 inches high, 1000 MHz wide puts the world in your pocket

## The New IC-R1 handheld receiver



Icom, still leading the way again in communications technology and miniaturisation with the world's smallest wide band receiver.

It's so small you could carry it in the palm of your hand or the pocket of your shirt.

Yes, an AM/FM and FM/W wide-band receiver that continuously covers 2 MHz – 905 MHz (Guaranteed specifications) and yet is small enough to carry anywhere.

Weighing in at a mere 280 g (9.9 oz) this tiny package features **MULTI - SCAN FUNCTIONS** including programmed, memory, selected mode and auto memory write with a capacity for **100 MEMORY CHANNELS.** Electronic locking of tuning control and keyboard prevents accidental frequency change, dual frequency selection, a built-in clock and timer functions – all running off an internal Nicad battery. The IC-R1 is equipped for high performance and is a "must have" item for any one on the move who is keeping up with the world and technology.

Find out more about the IC-R1 and the optional extras available – send in or phone for a free brochure – BUT HURRY – the R1 is selling fast!

## Versatile Mobile

### The New IC-R100 wideband receiver brings the world to your car

The IC-R100, with an ultra-wide band width of 500 kHz to 1800 MHz, was born of the technologically marvellous IC-R9000 (Icom's and the world's most sophisticated receiver). Operating from 13.8V DC with a built-in 15dB pre-amp to enhance weak signals (50 to 905 MHz), the IC-R100 is invaluable as a mobile and for base station use. Other features, such as an enormous **121 channel memory, built-in clock/timer** and, of course, **multi-mode scanning** functions for VHF/UHF/MW/HF make this a most desirable receiver.

Compact, economical and easy to operate as a scanning radio, it's no wonder the IC-R100 is stimulating great interest. By satisfying the demands of shortwave and broadcast listeners, scanner enthusiasts as well as business and professional users, Icom again leads the way. Contact us

by Freepost or phone for the name of your stockist, colour brochures on the IC-R1, R100 and the complete range of Icom receivers – IC-R9000, IC-R7000, and IC-R71A.

For further information call Icom free on 008 338 915

Melbourne callers (03) 529 7582 Icom Australia Pty. Ltd., 7 Duke Street, Windsor 3181.

Icom Australia's warranty is only applicable to products purchased from their authorised Australian Dealers.

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Please rush to me your brochure on the ☐ IC-R1, ☐ IC-R100 and the name of my nearest Icom stockist.

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CB Action

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***WIN A COBRA 148GTL***
***COURTESY OF HATADI ELECTRONICS***
***Read the report on page 50 and then try your luck on the Wordmaze...page 65***

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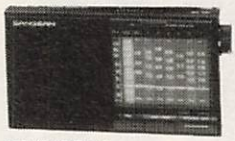

**MS-101 9-Band Shortwave Receiver — Ideal for Travellers:**
- Miniature size.
- Complete with personal stereo headphones.
- Includes short wave listening guide.
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- AM broadcast and FM stereo coverage.

*Cat # C6000* **$119.00**
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*Cat # T0321* **$19.95**

**ATS-803A Portable Communications Receiver:**
- Continuous coverage from 150KHz to 30MHz.
- AM/CW/SSB, Inbuilt RF gain control, BFO.
- PLL synthesised tuning, LCD display.
- Scanning, 14 memories, AM broadcast & FM stereo coverage, 12 short wave bands.

*Cat # C6030* **$299.00**
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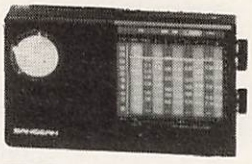
NEW

**ATS-802 Synthesised Shortwave Receiver:**
- Continuous shortwave coverage 5.8MHz to 15.5 MHz.
- 25 memories.
- Auto timer functions.
- Up/down tuning control in 5KHz steps.
- AM broadcast and FM stereo coverage.

*Cat # C6028* **$199.00**
- Optional AC adaptor

*Cat # T0630* **$24.95**



**MS-102:**
- Slightly larger than MS-101 but with 10 short wave bands.

*Cat # C6010* **$119.00**
- Optional AC adaptor

*Cat # T0321* **$19.95**

**ATS-808 Deluxe Shortwave Receiver:**
- Continuous coverage 150KHz to 30MHz.
- Stereo FM, LW + 13 shortwave bands.
- PLL synthesised tuning, LCD display.
- Scanning, 18 memories.
- Inbuilt clock, alarm, timer.

*Cat # C6040* **$249.00**
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- Approved by NSW Dept Minerals & Energy.

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- Audio output: 120mW.
- Size: 140mm (H) x 55mm (W) x 44mm (D).

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- Optional AC adaptor 6V DC 200mA

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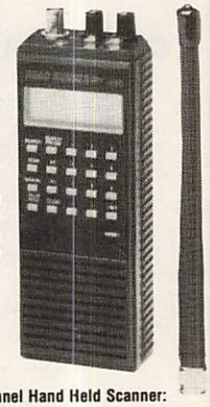

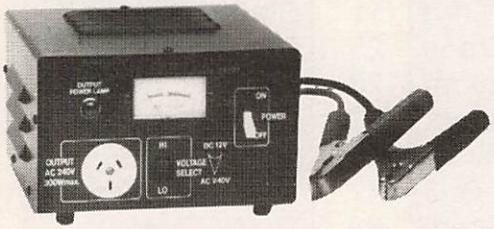


**Powermaster 300 Watt Inverter:**
- 12 V DC input, 240 volt output.
- Ideal for small microwaves, colour TV, mini fridges etc.
- Rural, marine applications.
- Modified square wave design.

*Cat # T3000* **$299.00**

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**Mobile Scanner AR-950:**
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- Search increments: 5KHz, 10KHz, 12.5KHz, 25KHz, 30KHz.
- Search, scan, priority, lock-out, delay/hold, AM/FM functions.
- Supplied with 2 antennas for optimum UHF and VHF reception.
- Inbuilt 20dB local/DX attenuator.

*Cat # C5015* **$499.00**
- Optional AC adaptor

*Cat # T1230* **$24.95**

**AR-1000 1000 Channel Hand Held Scanner:**
- Inbuilt 20dB Attenuator.
- 10 banks of 100 channels.
- Search, scan, lockout, hold, delay.
- Frequency coverage 15-550MHz, 830-1300MHz.
- AM, FM, FM wide
- Complete with carry case, Nicads, AC adaptor.
- Keyboard lock.
- Backlit LCD display.

*Cat # C5012* **$629.00**

**AR 900 100 Channel Hand Held Scanner:**
- 5 banks of 20 channels.
- 15 channels per second scan rate.
- Frequency coverage 60-90MHz, 118-174MHz, 430-512MHz, 830-950MHz.
- Search increments 5, 10, 12.5, 25 and 30KHz, depending on particular band.

*Cat # C5020* **$449.00**

**AR 900E** also available, covering, 108-136MHz, 137-174MHz, 220-290MHz, 300-380MHz, 406-470MHz, 830-950MHz. Suit military/aviation enthusiast.

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# ON CHANNEL

**BANNED?..MAYBE, WELL SORT OF, WHO KNOWS ?**

As is his wont, Furious Fewster really got things going in his 'Spectrum Anarchy' column in our last issue when he devoted some space to an amendment recently made to the Telecommunications Interception Act of 1979 which makes it an offence under the Commonwealth Crimes Act to 'manufacture, own, possess, use, etc.' an 'apparatus' which is capable of intercepting telephone conversations.

Now the facts of the matter are that you are entitled to listen to 'almost anything' on the radio spectrum. BUT, as we all know (don't we ?), it is illegal to listen to any traffic carried by Telecom Australia's network and this of course includes the cellular telephone band and the earlier PAMTS network, along with any other radiocommunication service which uses Telecom Australia connections.

Think about that...

If, as you are tuning quietly through the bands on your HF 3-30MHz receiver, you happen to hear a conversation on a Royal Flying Doctor Service frequency with one party tapped into the Telecom service to a telephone, the penny (cent ?) will quickly drop that you are using an 'illegal apparatus'...bet you didn't know that !

A scanner must equally, if not more-so, be an 'illegal apparatus' by definition.

As far as we can ascertain, this particular piece of legislation — as it now stands — means that scanners, HF receivers and anything else that is capable of hearing a telephone conversation, whether intentionally or otherwise, will be illegal....please don't panic.

This is, however, NOT what the legislation is intended to do. It is aimed at the use of what are generically known as 'bugs', devices which can be planted to specifically overhear telephone conversations...this is what the people who are trying to create this legislation are on about.

Again, our understanding is that as the Amendment now reads it would be possible for a judge to rule that anything capable of hearing a car and/or cellular 'phone is an offence under the Act. We stress that this 'appears possible', but, we also stress that such an event is extremely unlikely. So where does that leave us....

Well, like many Government decrees, it leaves us totally confused.

By the letter of the law, it seems that not only scanners but full coverage HF receivers and anything else you can think of are illegal if they are capable of hearing a telephone conversation.

We believe that the Amendment will itself be amended to make a degree of common sense, if it is not, there are going to be an awfully large number of honest citizens who are suddenly facing a five year jail sentence without the option...and we wonder where the authorities are going to stack all those amateur transceivers, full coverage receivers, scanners and things...and where are they going to build the new jails to house the offenders ?

Meantime, if you're game, we suggest you read the great piece by Rob Williams on how and when to listen to the Royal Flying Doctor Service elsewhere in this issue...but don't blame us if an RI leaps out of the magazine, grabs you by the throat and marches you off to court...life's really a risk, isn't it.


CB Action

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## UHF *made to frequency*
### Hand Held PortableWhips

1 **BNCS** ~ 100mm

2 **BNCHWS** ~ 120mm

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***Also Available with TNC & N Connection.***

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**DX1 Range** ~ Standard 20, 36, 42, 52, 60 & 72"

**DX2 Range** ~ Heavy 70" SKIPWHIPS

**DX3 Range** ~ Tune Tip 40 & 60" Mobi-Dickstick

**DX4 Range** ~ Tune Tip 25, 35 & 60" Bush Bandit

**DX5 Range** ~ Heavy Duty Tune Tip 40 & 60"

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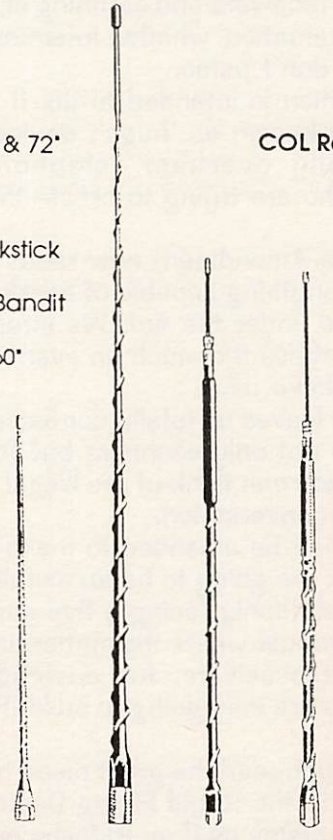


**Standard 5/16" 26TPI Female Thread**

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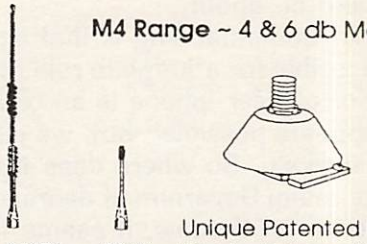
**COL Range** ~ 6 & 9 db Mobile, 9 & 12 db Base

**FDW Range** ~ Flexi Dip Whip 1/4 Wave

**M4 Range** ~ 4 & 6 db Mobile



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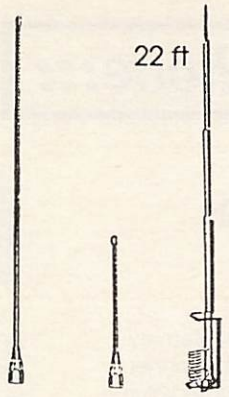


M120.1 M120.3 V27

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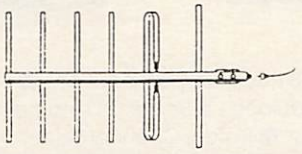

**3ELE** ~ 3 Element Yagi Beam 27MHz
**V27** ~ 1/2 Wave Ground Ind. Vertical 27MHz
**V30** ~ 1/2 Wave Ground Ind. Vertical 30MHz

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**'B' Series** ~ Base Station Antennas, 3db & 6db
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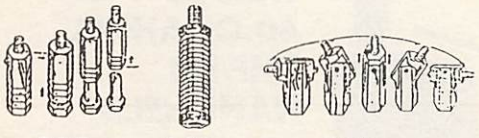

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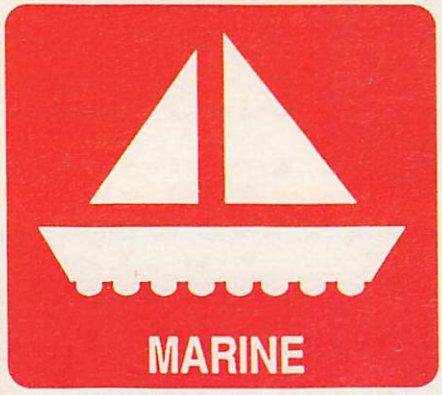


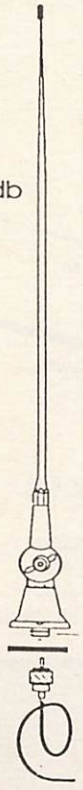

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CD470

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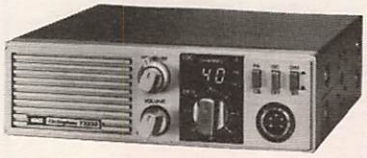

### TX830 AM SUPER DELUXE

■ Ch.8 Auto Recall on Mic. ■ Powerful Front Speaker ■ Interference Suppression Circuit (ISC) ■ Variable RF Gain ■ Signal Level Indicators ■ Power/Modulation Indicators ■ Dimmer Control

### TX826 AM DELUXE

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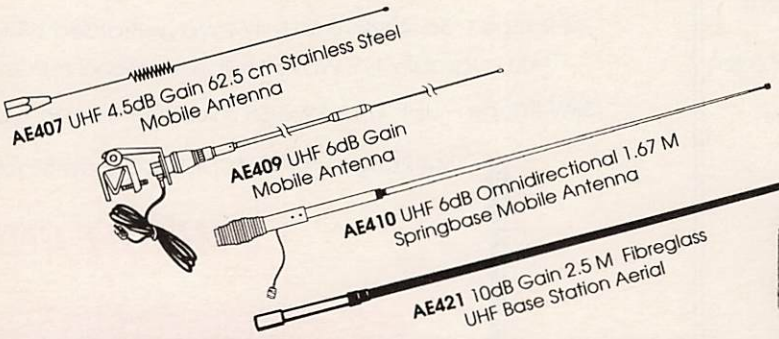
  —**Open Channel Scanning**
- Memory Protection Circuit
- Hi Intensity L.E.D. Display with Dimmer Control
- Sel-Call Option


**AE407** UHF 4.5dB Gain 62.5 cm Stainless Steel Mobile Antenna
**AE409** UHF 6dB Gain Mobile Antenna
**AE410** UHF 6dB Omnidirectional 1.67 M Springbase Mobile Antenna
**AE421** 10dB Gain 2.5 M Fibreglass UHF Base Station Aerial

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# NEWCOMERS START HERE

*Welcome to CB Action magazine — the only regular CB publication in Australia and also the oldest, having been first published in 1977.*

*CB is a form of radio communication which is popular around the world, however, unlike amateur radio, it is not necesary to pass an examination to go on air.*

*All that is needed is a licence and the equipment.*

*CB Action, though, is a little more than just CB. While CB is the backbone of the magazine, it also has reports and reviews on scanners, antennas, shortwave radios and other areas of general interest to radio communicators and listeners.*

*In the course of reading the magazine (and on air) it is probable that newcomers will encounter words which mean nothing to them.*

*This short introduction is to help these readers understand CB terminology and its application.*

*It should be stated right now that* ***there is no special CB language.***

*Many newcomers believe that they require a lecture on the basics of CB language before they can operate on air.*

*This is simply incorrect.*

*While some stations use esoteric CB jargon, all Australian CBers understand English and this is all you need to go on air.*

*A half hour spent listening before going on air for the first time will be time well spent as you will hear how to initiate a contact and how pass the conversation back to the other station and, really, that's about all there is to it.*

*Even so, while it is not essential that you know and understand some of the various abbreviations used and/or the amateur 'Q' code, it can be helpful to you.*

*That is what this introduction is all about.*

*One of the first things you will hear is a* ***QSO.***

*A QSO is simply a contact with another station.*

*It derives from the amateur radio operator's 'Q' code — a form of abbreviation used by amateurs when sending* ***CW*** *(continuous wave transmission) which is simply another way of saying morse code.*

*Morse code is not used in CB, however, a number of 'Q' code abbreviations are . . .*

*A* ***QSL*** *is a card sent from one station to another confirming that these stations have been in radio contact. It is not sent after every contact, but, is uaully exchanged after a* ***DX*** *contact.*

*DX means long distance, usually overseas but often just interstate. If the station to which you are talking asks whether you QSL the operator is asking whether you will send him a QSL card to confirm the contact.*

*A* ***QTH*** *is the 'Q' code for location so, if you're asked "what's your QTH?", the station is asking where your station is located. It's just as easy to ask in plain English, but, it adds a bit of glamour if you say QTH instead.*

*You'll hear many stations talking about* ***SWR*** *(usually pronounces swer — which is incorrect — it is SWR spoken as letters) and this stands for* ***S****tanding* ***W****ave* ***R****atio. This is essentially a measure of the antenna's effectiveness and is read off an* ***SWR meter.*** *You will learn what SWR is from this magazine or from a CB store.*

*When you hear a station calling* ***CQ CQ*** *it means that he is looking for a contact with another station. CQ means 'seek you' while* ***CQDX CQDX*** *is different (seek you long distance) in that the station only wants a long distance contact — not a local one.*

***AM*** *stands for amplitude modulation while* ***SSB*** *stands for single sideband. If you have an AM only rig it's nice for everyone if you stay on the lower channels and, conversely, if you are using SSB you should restrict your activity to the upper channels.*

***QSB*** *means that the signal has a tendency to fade — that is, it goes from strong to weak and back to strong again, sometimes over a period of seconds and other times over a period of minutes.*

*It is not a fault of the station, but, of atmospheric conditions. If a station says there is QSB on your signal it means that your signal is fading and when this occurs it is best to keep your* ***OVER*** *short or you are likely to lose the other station while you're talking.*

***SKIP*** *is essentially the same as DX — if the skip 'is running' it means that there are interstate and/or overseas stations being heard.*

***BEAM, YAGI and ARRAY*** *all mean much the same. They mean that the station is using an antenna system which effectively (and legally) increases the restricted power output of the CB rig and can be pointed at the other station for improved communication.*

*A* ***ROTATOR*** *is used to turn a beam, Yagi or array. Incidentally, YAGI is spelt with a capital Y as Yagi is the name of the inventor of the beam.*

***LINEAR, BOOTS, AFTER-BURNER, LITTLE HELPER, etc*** *mean that the station is using illegal equipment to increase the power output and will eventually receive a call from* ***DoTaC.***

*DoTaC is used in this magazine as an abbreviation for the Department of Transport and Communications — the authority charged with the regulations of CB radio.*

*A* ***POWER MIKE*** *is an after-market accessory which can also improve your station's 'talk power'. Whether or not they are legal is open to question, but, they probably aren't.*

***QRM*** *is when another station is making it difficult to hear due to being too close to your own station, having a rig in poor condition, running illegal power, etc.*

***QRN,*** *however, is noise made by atmospheric conditions or, more likely, static caused by poorly installed electrical power lines out in the street.*

*A* ***SWL*** *is a* ***S****hort* ***W****ave* ***L****istener but an* ***XYL*** *is usually the wife — an ex-young lady.* ***YL*** *is of course young lady and a* ***DOUBLE BUBBLE*** *is a police vehicle.*

***GOOD BUDDY*** *is a somewhat derogatory term applied to operators who still use American style CB jargon such as, "what's your 10-20?" or "that's a big 10-4".*

*This 10 code originated in America, but, is now rarely used as it indicates that the operator has what can be best termed a 'juvenile brain'.*

*A* ***BREAKER*** *is an operator who wants to get into an existing conversation and there's nothing wrong with* ***BREAKING*** *providing that you only call in the pause between overs.*

*If you break between overs one of the stations will probably say* ***ACKNOWLEDGE THE BREAKER*** *which means that you have been heard and will be invited to join in when the stations are ready — in other words standby and don't keep shouting.*

*An* ***ALLIGATOR*** *is another derogatory name which is applied to an operator who talks too much but doesn't listen — in short, all mouth and no ears.*

***SANDBAGGING*** *means to listen to a conversation but not join in yourself.*

*A* ***DUMMY LOAD*** *is a device which should be used when testing or tuning your rig. It can be purchased from any CB store and should be a must in your list of station equipment.*

***UHF*** *stands for* ***U****ltra* ***H****igh* ***F****requency and is the 477 MHz CB service.*

***LONGPATH*** *means that you are pointing away from a station you are speaking with rather than* ***SHORTPATH*** *which of course means the opposite.*

*Different atmospheric conditions mean that at certain times you can communicate with (usually overseas) stations by sending your signal right around the world rather than by the most direct path.*

*An operator who works out of the legal channel frequencies or runs illegal equipment is referred to as a* ***PIRATE.***

*An* ***ATU*** *stands for an* ***A****ntenna* ***T****uning* ***U****nit which is used to tune your antenna to a good match with your rig if the SWR is a little too high.*

*It won't cure any major SWR problems, but, it can adjust a slightly high SWR reading to a 1:1 match with the transceiver.*

*If you receive a visit from the* ***RIs*** *you're probably in trouble for causing* ***TVI — T****ele-****V****ision* ***I****nterference — or —* ***BCI — B****road-****C****ast* ***I****nterference. RIs stand for* ***R****adio* ***I****nspector — the gentlemen from DoTaC who call around if there are any complaints about your station.*

*RIs are also often called* ***RED INDIANS.***

***COAX*** *stands for coaxial cable, the link between your rig and the antenna while a* ***WHIP*** *is not something wielded by a leather-clad lady but is rather a generic term for mobile antennae.*

*A* ***REPEATER*** *relays a UHF CB signal from one point to another so giving much greater range of communication and a repeater list is published in every second issue of this magazine.*

*After all of the above we reiterate — it is not necessary to learn CB jargon to go on air. Sure it helps, but, it will all come in time — for now though just use commonsense English and if you don't understand something don't be afraid to ask — remember everyone you hear also had a first time on air.*

*We hope you enjoy CB and CB Action.*

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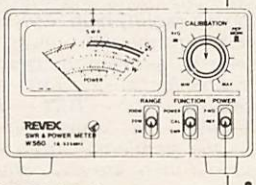

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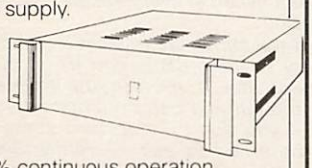

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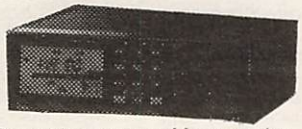

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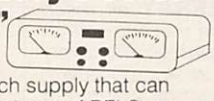

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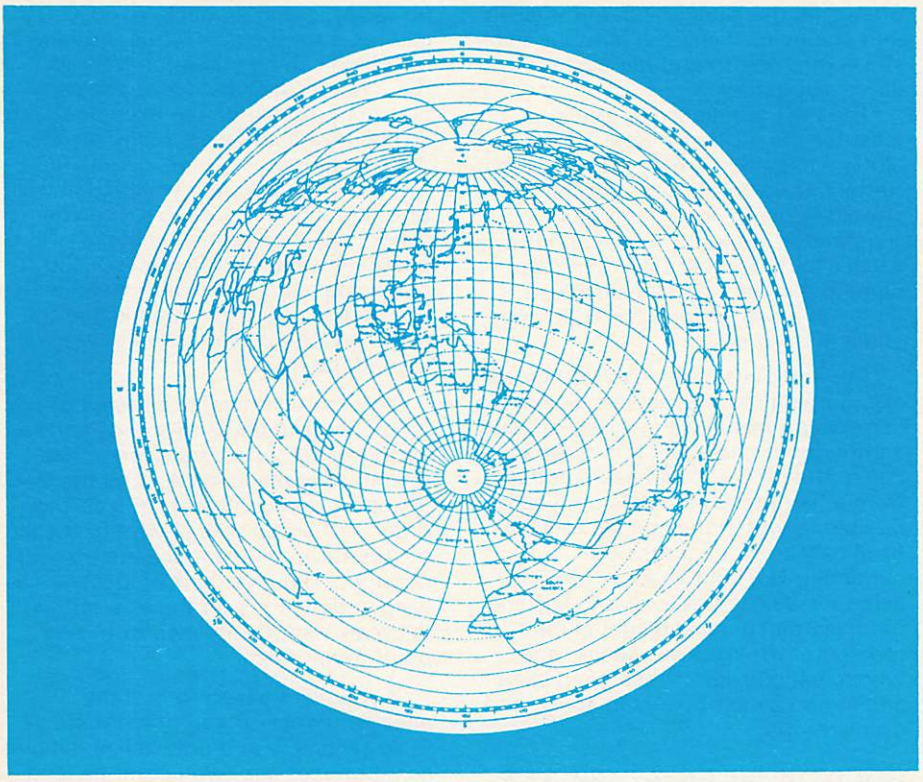


# RADIO PATHS

## *The long and the short of DX.... In which young George learns the difference between short paths and long paths, without being led up the garden path ...*

**If you've ever been baffled by some of the mysteries of radio, do not feel alone. Meet young George. George is CBA's keen but green office boy, and whenever a spare moment arises he corners us in the search for knowledge of CB and all things related thereto. Last month he caught sight of our editor, who had almost disappeared under his high-rise 'IN' tray (the first piece of office equipment ever to require building approval), and began asking about paths. George escaped with his life and the following explanation.**

You're sitting in front of the base station and the band has really opened up. Signals are pouring in from all over the place, some of the distant skip drowning out the guys in the next suburb. To make things even more complicated, a 'CQ DX' from some far-flung country has caused a pile-up of eager skip shooters.

This may be a familiar scene, George, and it will become even more so in the coming year. You might remember the amazing conditions of 1981, which was a virtual DXer's paradise. For both then and now you can thank sunspots, high- powered solar flares that bombard earth with the ions that make skip possible. Yes George, those sunspots are at it again — hitting the peak of their 11-year cycle, strengthening those layers of ionised gas miles above the earth which reflect radio signals just as a mirror reflects light and a cliff face an echo. but, this you already know, having spent three hours last week chatting up a bird who lived in Kew, only to discover her Kew wasn't that Melbourne suburb next to yours, but, the one just south of Port Macquarie, NSW. Your question was, how do those radio waves make their trip from transmitting antenna to receiving antenna?

### A LESSON ON LAYERS

Let's start with a quick revision of the basics of skip. You know that signals can travel between stations either directly, on what is called the ground wave because it travels along the ground, the earth's surface; and they can also travel indirectly, on the 'sky wave' which bounces off the ionosphere to be heard anywhere from the other side of Australia to the USA and Europe.

Now take in hand a tennis ball, cricket ball or ideally a globe, because this is what the ball will represent — our planet. Now imagine a cloud around the ball, some distance away from the surface. This cloud is the ionosphere, made up of several layers whose height above the earth depends upon the time of day, the season and of course the amount of sunspot activity. For the frequencies which we use — 27 MHz, or the 11 metre band — we are primarily concerned with the 'E' layer and the 'F' layer.

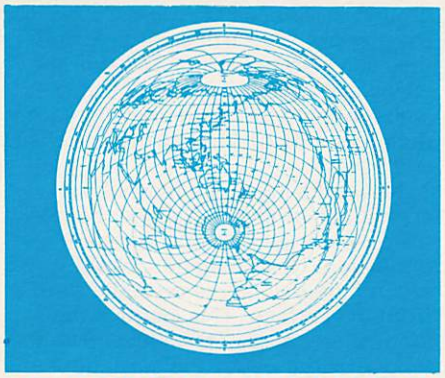
The closest to earth is the E layer, at some 100 km above our planet, and it cannot remain in a heavily ionised state (required to reflect signals) unless it is being continuously bombarded by direct sunlight. So signals are most likely to bounce from the E layer — a process called 'E skip' — during daylight hours. The maximum range you'll get from a single hop or bounce from E skip is 2000 km.

Once in a while, patches of dense ionisation can occur in parts of the E layer during the evening or at night. When this happens we get sudden paths between stations using E skip, sometimes lasting no more than a few minutes and sometimes for hours on end. Remember that this 'sporadic E' condition happens when you least expect it — maybe in the middle of an April night, instead of 3 pm on a hot December day. So who can blame you when you find it hard to believe the guy pushing a 30+ signal who says he is on the other side of the country?

Most of the really long distance skip, George, is caused by the F layer, which during the day splits into two parts (F1 and F2). These layers are about 220 and 300 km above earth, and recombine to a signal layer at about 280 km at night. Being much higher above earth than the E layer, F skip has a much greater angle of reflection and so gives a much longer path between two points on earth — the maximum distance for single hop F skip is 4000 km, twice that of the E layer.But, there is no reason why your radio signal has to make just one hop from any layer.

It is quite possible for it to bounce right back up again and make a double hop, which would cover a path of some 8000 km. Even though such a trip will see a considerable part of the radio wave's energy absorbed by the

**(continued over)**



# RADIO PATHS

## (continued)

ionospheric layer and the ground, there is frequently enough left for a multi-hop trip right around the world.

Of course the ideal time for DX to take place is when reflection from the ionosphere is at a maximum and absorption of energy at a minimum. The 27 MHz paths are at their best when there is enough ionisation in the F layer to reflect your signal, yet before the E layer becomes so heavily ionised as to absorb large amounts of the wave's energy before it reaches the F region, and also as it is returned to earth.

So it is important, George, to have good layers. We know your aunt has often said the same thing, but, seeing that she owns a chicken farm we think she is referring to another sort of 'layer' altogether.

The best condition for layers, at least for the 11 metre type, exists along what is known as the 'terminator'. No George, not the Arnold Schwarzneger film, this 'terminator' refers to the line on the earth's surface where day becomes night and night, day. Consider that here you are in Melbourne, 6.30 am, and it is daybreak.

The earth is slowly revolving on its axis, turning to face the sun. So half an hour later it is sunrise in Adelaide, and another hour and a half it is dawn in Perth. Now if you could see Australia from a few thousand miles up, you'd be able to watch the sunrise moving from east to west across the continent, like your shadow moving across a wall as you walk by. The line between darkness and light is the terminator of which we speak, and whose eerie progress has been seen and filmed by astronauts in space and on the moon.

### GOOD DX and GREAT CIRCLES

By now, George, you may have all but given up on trying to understand DX, let alone predict it. Solar flares, seasons, times of day, surely it would be easier just to sit back, call 'CQ DX' and hope for the best? True, nothing in radioland can be taken for granted. But, we can play the odds. We can place our money on the expected, and still be aware and even ready for the unexpected.

The key is the path your signal will take. Let's briefly jump back to your school days, and those endless geography lessons. Remember the maps you used, long wide maps with England on one side, America on the other, and Australia tucked down around the middle.

This map, known as a Mercator projection and named for the Flemish cartographer who conceived it, has tended to make us think of all the countries and continents in a certain order — Europe was always to the left of Australia, and America eternally to our right. Thus we think of locations as lying in directions on the axis of this flat map, as straight lines from one point to another.

If you were asked to plot the shortest direct course from Australia to Argentina, you'd draw a line running east between the two countries, and probably along 35 degrees latitude. but, of course the world isn't flat, and if you had a globe to hand you could see that the shortest route between ourselves and the Argentines is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actually via the south pole. It looks strange, heading off in completely the 'wrong' direction, but, this is the shortest path.

You didn't think of this because you, like most of us, have been brought up on the Mercator projection, and to travel via the south pole would have meant drawing a line off the map, breaking the rules.

Today, many airlines travel across the north and south poles to travel to their destinations, flying what are known as the polar routes. Radio waves do exactly the same thing, they take the shortest most direct path, along what we call the 'great circle' route. By using a 'great circle map' centred on Melbourne you can read off the correct beam headings to your desired DX destination.

And here's where that terminator comes in. Let's take a shot at calling someone in the UK, which is practically the other side of the world from us. In fact it is just on your breakfast time, while over there they're settling into dinner. But, since it is still early morning at our location and dusk at his location, we are both within the terminator line and propagation will be at a maximum over the path between our two locations.

So, George, you can forget the old assumption that DX is a late-night phenomena. On the top half of the HF band, from the 14 MHz ham band through to 27 MHz CB, most of the best overseas DX is worked during daylight hours. Regular and reliable night-time DX is only a reality on the lower frequencies, and especially if you are working within Australia, as the amount of man-made noise (industrial and electrical) is at a minimum when everyone from Brisbane to Perth has stopped work — say, from 7 pm to 7 am EST.

Lower frequencies are also affected by lower levels of the ionosphere than the E or F layers, and these are all reasons why you'll hear AM broadcast stations booming in from around the country on your car radio while the lower side of 16 or 35 might be absolutely dead. This only changes during sunspot peaks, when the bands can stay open long into the night, and also when sporadic E brings in the long haul signals at any old time.

## THE LONG AND THE SHORT OF DX

Let's get back to figuring out how the skip is running, and staying one step ahead of the rest of the DX hounds. There are basically three major factors which will have a bearing (sorry, bad pun there) on the path you will use. These are the time of day, the season of the year, and the condition of the E and F layers.

At any given time there will be a maximum usable frequency or MUF, this being the highest frequency that will be bounced back to earth with any degree of reliability. Frequencies above the MUF will continue through the ionosphere and out into space, never to return. And it is frightening, George, to consider that our first contact with an alien life form might be their reception of the AM call channel — maybe that's why they've not bothered with us.

Anyway, if you have a shortwave or HF receiver you can tell if conditions are right for some 11 metre openings, by listening to the 21 MHz and 14 MHz amateur bands. If signals are coming in strong on these bands, then warm up the rotator and get the log book out. If the ham bands are quiet, and DX either weak or non-existent, you can forget about adding those rare QSLs to your collection — at least for tonight. There might be some sporadic E just over the horizon (literally!), but, this is the wild card in our deck. Sporadic E isn't something you wait for, it's something you grab with both hands when it appears and then hold on tight for as long as you can.

Having got your confidence up to a reasonable level, let's now point out that there are in fact two paths, one long and one short. Which you use depends on the time of day and how conditions are in the reflecting layers of the ionosphere.

You might be sandbagging a local sidebander who's chatting away to a UK station and giving him an excellent report, so you look up the short path heading, swing that beam around and all you get is a weak, fluttering signal. Hmmm ... could both stations be working via the long path? Just add 180 degrees to your current beam heading, and watch that S-meter climb up the scale. The long path adds another few thousand kilometres on the trip, but, that's where the best propagation is at the time, and who are you to argue with the radio signal?

Sometimes the signal travels along both paths at the same time, and you can tell because you'll hear an 'echo' as the long path signal arrives just after the short path component. Sure, the transmissions are travelling at 36,000 km per second, but, the distances around earth are so great that the split-second difference between paths is enough to provide that recognisable echo.

Now given all this, George, it quickly becomes obvious that a directional or 'beam' antenna is just the thing for working DX. You can get by with a normal vertical stick, but, because they receive signals from all directions at the one time, you are putting your radio at the mercy of the ionosphere and mother nature, not to mention every other CBer for miles around. There you are, straining to catch a rare station, when it is swamped by another signal.

It might be the bloke down the road, across the country or even some overseas station you worked last week — wouldn't it be that much easier if you could just tune into the direction of that exotic callsign and ignore everyone else, just like you can turn away from bright light or a harsh sound ? That is where the beam antenna really comes into its own, and it is the reason why your beam should have a good 'front to back' ratio — to reduce unwanted signals from the rear and sides of the beam, and favor those from the direction in which it is pointed. Beam owners are the first people to hear the DX, and the ones who can stay working them when everyone else has given up.

Of course there's more to being a DXpert than understanding ions and aerials. There's a bit of black magic and more than a pinch of sheer luck. but, when you know what those radio signals are doing, where they are going and how they are getting to you, can make the most of radio paths. And that, George, is the long and the short of it.


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## The Panther MK IV . . .

# LOOKS GOOD, GOES WELL

***All sleek black as you would expect from the animal it is named after, Hatadi's latest am/sideband offering the SUPER PANTHER MKIV more resembles its MKII predecessor in appearance than the more recent slim-line MKIII model.***

The PANTHER MKIV is a complete departure from the last model in shape, styling and circuitry and by the looks of the internals and the chassis it has been manufactured in Korea by the same factory that turns out a few of the other super animals for the PEARCE SIMPSON marque.

### AN IMPRESSIVE RANGE OF FEATURES

The new Panther has an impressive range of features including a built-in SWR meter and adjustable RF gain and microphone gain controls. Full use is made of dual shaft controls to maximize the available front panel space. Squelch and on/off Volume controls occupy the left most rotary control followed by RF gain and Mic. gain in the center with the Clarifier and SWR meter calibrate control filling the final slot.

The microphone socket is set in the lower left of the control panel — just where it should be — with five rectangular, press-button switches set to the right. The first button is a mode switch for PA or normal CB operation followed by a pair of switches to activate the noise limiting circuits — Noise Blanker and Automatic Noise Limiter. The next switch selects between AM and SSB operating modes with the final switch selecting Upper or Lower Sideband.

The upper half of the front panel, for about two thirds the width of the panel, is occupied by the information display window which contains a well lit edge reading meter, the channel display LEDs and a row of indicator lights to inform the operator of the activated functions in use. On the far left of the window is a three position slide switch which controls the meter function from the standard S/RF meter to SWR mode for Forward and Reflected power readings. Last but not least is the channel switch located conveniently on the far right hand side of the front panel.

The rear panel carries the usual line up of antenna connector, power socket and the audio jacks for PA and EXTension speaker connections. The case halves are held to the subframe by 8 self tapping screws.

### IT JOINS AN EXCLUSIVE LITTLE CLUB

The Panther now joins an exclusive little club by offering a 'back-lit' control panel with all main control knob surrounds radiating a cool, blue light just strong enough to identify the controls in the dark...and it looks great.

The circuit board is 'single-sided' phenolic material with the parts layout remarkably similar to some other models in the Hatadi range. The parts insertion on the board are not as neat and square as we would like to see, however, one must remember that the retail price of this rig is well below the Cobra also reviewed in this issue.

Operationally the Super Panther turned in an AM sensitivity of 0.35 microvolts for 12dB SINAD and a fairly lopsided response on sideband where USB was 0.5 microvolts and LSB could only make 0.75 microvolts. The best threshold Squelch figure obtained was 1.7 microvolts ranging to 7,000 microvolts in the 'tight' or maximum condition. The Clarifier was a bit off centre for proper tuning at about the 1:30 o'clock position. The noise limiting circuits operated well and gave good results on most types of impulse noise interference.

### GOOD TRANSMIT POWER

AM transmit power was excellent at 4.5 watts and on upper and lower sideband transmissions the output easily made the 12 watt PEP specification. Frequency accuracy was slightly off with LSB about 200Hz high while USB was 'right-on-the- nose'.

AM modulation was good and normal peaks were held down to about 95 per cent by an effective ALC (automatic level control) circuit

### SUMMARY

**The Panther IV is a nice looking rig in keeping with today's CB fashion. The front panel is well laid out, controls easy to use and the level of output power is excellent. Internal construction could be cleaner, however, overall the rig works well and should prove to be a good seller in its price range.**

## It's destined to become a quiet achiever

# THE AR 1000 SCANNER

***The label on the box says, "WIDE RANGE MONITOR", somewhat of an understatement. Scanning Action's Russell Bryant puts the latest general-coverage, handheld scanner from Access Communications through its paces. The AR 1000 passed with flying colors.***

Some scanners arrive on the market preceeded by their sometimes grossly inflated reputations. Others appear quietly, without fanfare, without great expectations and basically build up a devoted following with value-for-money and well-above-average performance.

The AR 1000 is set to become a "quiet achiever". It has a frequency range second to no other handheld scanner currently on the market and within their price brackets ($500-$600). Ostentatious it isn't. For example, apart from the rear label there is no outward suggestion of the frequency range of the AR 1000. With a frequency coverage of 8-600 then 805-1300 MHz, little is missing in the 200 MHz gap between the bands. The AR permits reception of signals in the shortwave — VHF low, mid-VHF, air VHF and VHF high bands, as well as military UHF, commercial UHF, 800 megahertz and extending into the gigahertz bands.

Some of the other features set to amaze scanner enthusiasts are user selectable search/scan stepping. Any increment between 5kHz and 995kHz (in 5kHz steps), can be chosen. For UHF 12.5kHz is also included in the incremental stepping. Receive modes for AM, FM and WFM are selected at the touch of a button, permitting monitoring of FM broadcast stations, television audio carriers and military communications. Now for the best news. The AR 1000 comes standard with 1000, (yes, you read correctly ), 1000 memories, divided into 10 banks of 100. I can tell you, it is not easy finding that many frequencies to program into the AOR.

All this, plus more, fits nicely into a unit that measures 70 (W) X 170 (H) X 39 (D) cms and weighing around 400 grams. Internal power is via 4 AA, 600 mAh Nicads batteries which are supplied with the scanner — current requirements are quoted at 90 mA. Operating under normal conditions, the AR 1000 has a duty cycle varying from six to eight hours. With some of the more active services locked-out of the scan sequence, nearly 10 hours of scanning were possible, before the batteries required a recharge.

Another plus for the 1000 is, that when the batteries discharge, the memories are not erased. AOR has employed an EEPROM, (electronicly erasable, programmable read only memory), intergrated circuit for memory retention. The frequency is permanently stored in the memory chip, until you program another over it, or clear the channel.

Like several other general coverage scanners, the AR 1000 has 10-user programmable search banks. Unlike the others, the number keys which activate these banks are not subtitled. Personally I prefer the titles below the number keys, it makes it easier to remember what is stored where. Again, unlike "normal" scanners, when the SEARCH mode is selected for a particular bank, the 1000 doesn't just cycle on the chosen bank. On completion of searching bank one, it then moves to bank two, then three and so on. If you wish to search only a single bank, the remainder can be locked out.

Programming the AR 1000 is not as easy as other handhelds. It requires a little more attention to detail than say, a Bearcat 200 XLT, Cobra SR 15 or the Realistic PRO series. The task is simplified by prompts from the LCD during the programming procedures in which the radio assists by indicating the next function button to press.

Programming is carried out with the scanner in the MANUAL mode. A flashing "MHz "symbol indicates that a frequency can be entered onto the display, after which, it is necessary to store the entered frequency into a memory bank and channel. On activation of the PROGram key, the "BANK"prompt flashes, following the selection of the bank number, (1-0). The radio then requests the channel to be programmed. Entering the two channel digits and receive mode completes the programming sequence for the 1000.

There is no beep to acknowledge the pressing of a key, again the debate arises as to the pros and cons of this feature. I prefer it, as the beep echos the operation of a key. During search/scan, delay is automatically selected, which cannot be deleted from the LCD. By pressing the DELAY/HOLD key, you can toggle between the two commands. In SCAN, HOLD is like a second manual control, a handy device, especially when you are occupied doing other things and unable to devote the attention required to the radio.

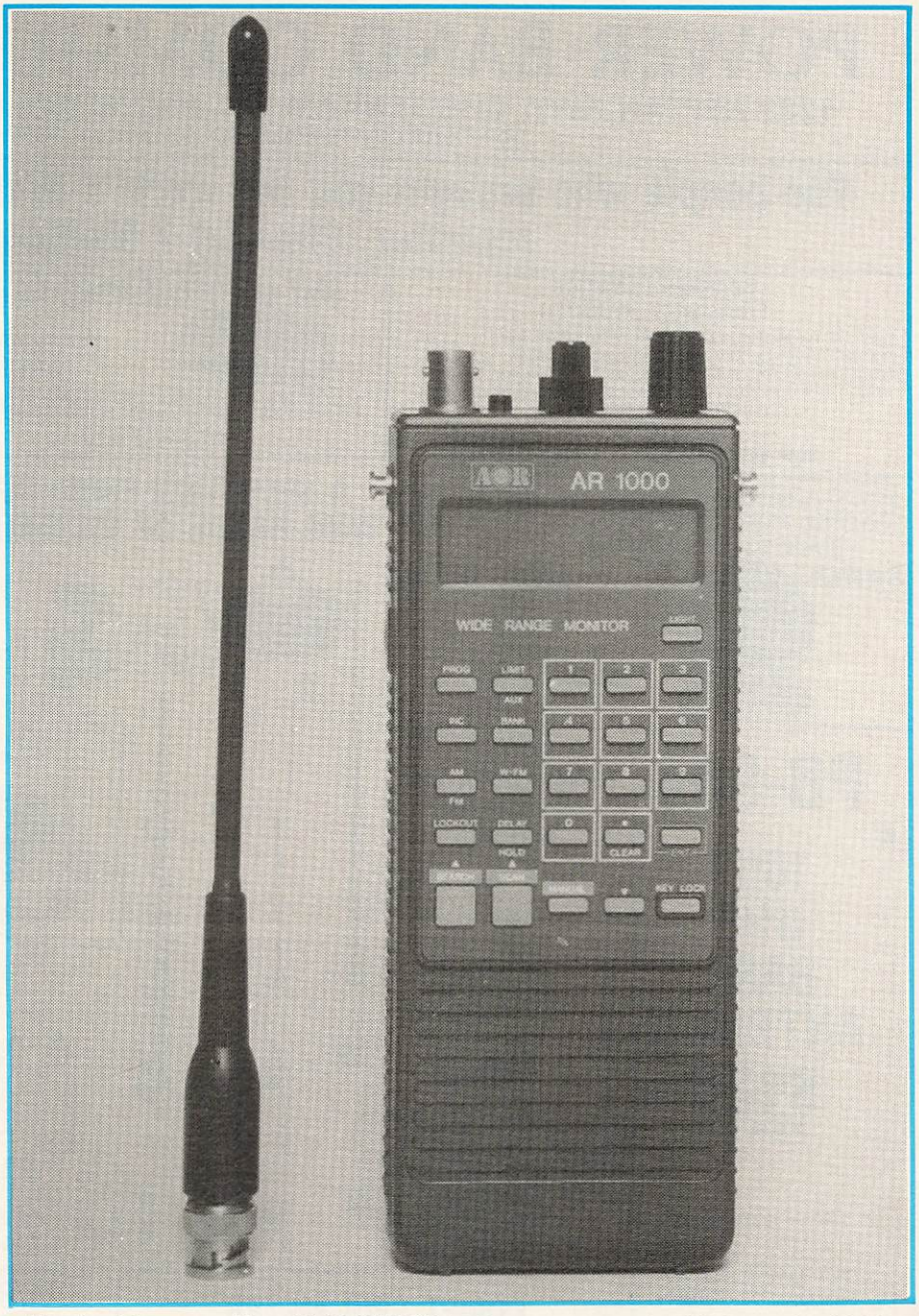
AUXiliary is AOR's term for priority. You simply enter the desired bank and channel, the scanner then samples the selected channel every two to three seconds. Should a transmission be detected the scanner locks in on the priority channel. When sampling priority it doesn't have the annoying cut in audio.

The full function LCD is able to be illuminated for night or low light operation. The light remains on for about five seconds before turning itself off which helps to prolong battery life. A built-in attenuator switch allows suppression of strong signals in high RF areas. Labelled LOCAL/DX, you can remove 20dB from the signal when in the LOCAL position. Should you wish to manually search or scan for frequencies, the AOR 1000 has a rotary UP/DOWN control. If there is any interuption to the programming sequence the scanner defaults to 12.5 kHz steps, therefore requiring the stepping to be selected again. The single scan/search speed is quoted as 20 channels per second. Uninterrupted, the 1000 completes a cycle in just under a minute. A faster speed, or selectable speeds would be nice, however we can't have everything.

The audio from the on-board 100mW speaker is excellent, especially when listening to FM broadcast stations. Sensitivity varies, from 0.5 microvolt to 1 microvolt across the entire frequency range. Image rejection is excellent by virtue of an IF frequency within the 600 MHz range. Selectivity is in accordance with the rest of the radio, top notch! The AOR 1000 does suffer from a number of birdies. However given the frequency range I don't see it as a problem.

Keyboard layout is good, the grey rubber buttons are well spaced, with no side movement, and a strong positive feel makes for error-free operation. To protect against accidental activation of the keys, a recessed lock switch is provided. All keys, with the exception of SCAN and SEARCH, are the same size. The aforementioned are three times the height of the others. When using the AR 1000 mobile or at night, identifying by feel which button is which is made easier. Volume and squelch are concentric and are able to be operated without affecting each other.

Included as standard with the AOR 1000, is a leatherette carry case, the front of which has a soft plastic window, thereby allowing access to the keys, yet providing protection from dust and moisture. A departure from the usual rubber duckie-type antenna that we normally associate with scanners, is the inclusion of a high gain whip. Looking more like a 3 dB UHF CB handheld aerial, it seems to work well on all bands. In fact, I could monitor Radio Moscow on 21 MHz without fade or signal loss. As well as the case and antenna, Access include a strong metal belt clip, ni-cad batteries, carry strap, earphone, AC/DC power supply and a mobile cigarette lighter cord — a complete outfit.




Overall the AR 1000 represents scanner technology at its best — massive frequency range, huge memory capacity, selectable search/scan increments and receive modes. There are two features, however, I see as being essential in a scanner the calibre of the AR 1000 — firstly a bulk memory erase. Individual memories can be cleared, but it is a long process should the entire 1000 require attention. My second "like to see" is AF (audio frequency) scan, whereby the receiver locks in only on a signal which is modulated by voice. All in all, considering the size of the AOR when compared to the Icom IC R 9000, it is surprising how they fit 1000 channels into such a small package.

If you are restricted to one scanner only, and are undecided on which one to buy, take a look at the AOR 1000, it has all the features of many of the base super scanners plus more. With a recommended retail of $625 it is hard to beat, given all it offers the user. It certainly has my stamp of approval.

Thanks to Access Communications, Sydney office, for the loan of the AOR.

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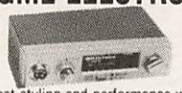

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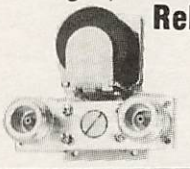

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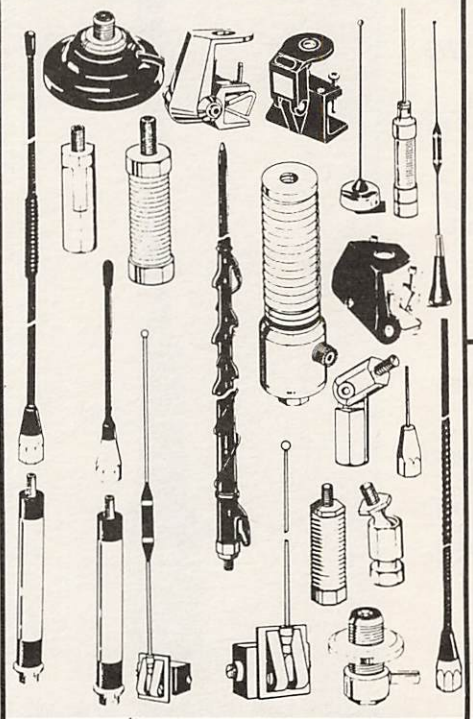

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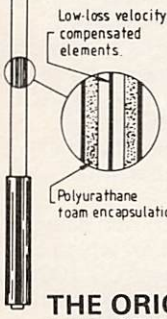


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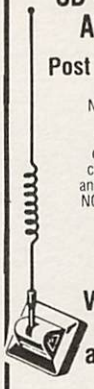

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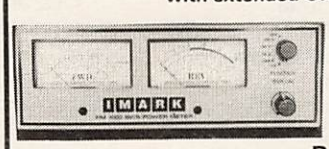
with extended UHF range



A top quality VSWR power meter covering from 3MHz to over 1,000MHz in two ranges. A must for the serious UHF enthusiast. Australian made. 'Eats' the imported competition.

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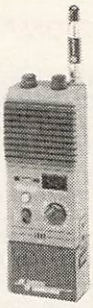

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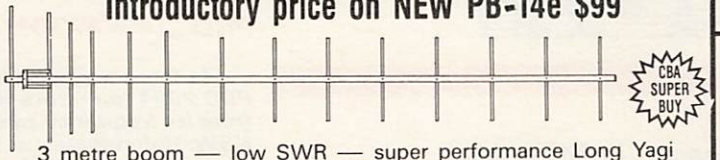


3 metre boom — low SWR — super performance Long Yagi Array

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200 ch. Intelligent memory 12 bands with 10 priority ch. ch. lockout scan delay.
Clip-on batt pack.

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See review CBA Mar/Apr.

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is a base loaded, stainless steel 27MHz antenna with a replaceable whip top. The unit is pretuned and is excellent for use on magnetic bases and in situations where fibreglass whips are easily damaged. Fits standard 5/16 mobile mount.

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**$35** Installed at our premises.

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**RUSSELL BRYANT'S**

# SCANNING ACTION

***All frequencies are in FM unless otherwise stated, all times are in local time, unless indicated differently.****

## MAILBAG

***Before opening the mailbag for this month I have a request. Would the 'Secret Republican' please write to me with an after hours telephone number.***

And from the Secret Republican I am assured that this is the correct list of frequencies and channels used by the STA buses. A printing error in a previous entry may have caused some confusion. If other readers can contribute to the list please write to Scanning Action.

**CH.1 486.225 481.025 MANLY, BROOKVALE, NORTH SYDNEY, WILLOUGHBY**
**486.475 481.275 NEWPORT**
**485.625 480.425 MANLY, BROOKVALE, NORTH SYDNEY, WILLOUGHBY**
**486.200 481.000 MANLY, BROOKVALE, NORTH SYDNEY, WILLOUGHBY**
**CH.2 485.900 480.700 MAROUBRA, WAVERLEY, RANDWICK, CLOVELLY, BOTANY**
**485.925 480.725 MAROUBRA**
**486.175 480.975 NEWPORT**
**CH.3 485.600 480.400 LEICHHARDT, BURWOOD, KINGSGROVE**
**485.575 480.375 GREENACRE**
**CH.5 486.500 481.300 INSPECTORS**

## MELBOURNE YUPPIES

***From one reader who likes passing some funny Argentinian bank notes, comes a list of frequencies used by the 'yuppies' in Melbourne.*** They are 464.100, 460.375, 452.650, 473.200, 474.675 plus 486.725 to 487.175 and 487.475 to 487.575 MHz. Perhaps a Melbourne reader may enlighten us as to the users of these frequencies. Our Argentinian friend, from Croydon, VIC, would like to know the Customs frequencies. Any takers?

## SOUTH AUST SERVICES

***Dean, in Mt Gambier SA, checks in with a list of frequencies for southern South Australia.*** First-up is the Country Fire Service on 163.360 and 163.240, South East Telecasters 162.400, Radio 5SE 168.160, Metro Fire Service 168.880, St John Ambulance 159.190, SES 167.410 and finally Department of Fisheries 485.700.

## KARRATHA FREQS

***Mick, from Karratha, WA, sends along the following frequencies for his area*** — police 79.330, SES 164.435, Karratha Airport 124.500 AM, Ansett WA company channel 130.600 AM and Port Headland Tower 119.900 AM.

## MEDIVAC CHOPPER

***My Melbourne contact has come up with an interesting frequency*** — 412.525 MHz is being used by the Victoria Police Medivac helicopter to communicate with the Alfred Hospital Road Trauma Centre. Apparently there are a few teething troubles. When the chopper becomes airborne they are unable to talk to the hospital. It is anticipated the problems will soon be ironed out and the system up and running at full strength.

## PRO 2004 MODIFICATION?

***"Is there a modification that can be carried out on the PRO 2004 to restore the 520-760 MHz portion missing from its frequency range?" asks Mark, from Bullaburra, NSW.*** Unfortunately at this stage there is not. One reason is because the first IF of the scanner, in this case 610 MHz, is within the range mentioned. Generally it is not a good idea to have the IF frequency as part of the scannable range. It tends to lock up the radio because the scanner detects its own oscillator or IF frequency. As most of the signals within that missing bracket are television audio and video carriers, I don't think the mod would be worth the effort.

## IMAGE FREQUENCIES

***Maroochydore, QLD, is where Martin uses his PRO 34 to scan the local police on 468.450.*** However, he says he also receives the Sunshine Coast police on 489.850 and wonders why. There's no mystery, it is an image frequency. The mathematics of working out an image are simple — if you subtract 468.450 from 489.850 you are left with a figure of 21.4 MHz. Divide 21.4 by 2 and the result is 10.7 MHz, the first IF (intermediate frequency) of the scanner.

Different scanners have different IFs. In early Bearcats it is 10.8 MHz, however, in the Uniden range the IF can be either 10.8 or 10.85 MHz, depending on date of manufacture. With the exception of the PRO 2004, 2005 and the new 2006 (which have an IF of 610 MHz), the intermediate frequency of Realistic scanners is 10.7 MHz.

## BLUE MOUNTAINS POLICE FREQS

***Leslie, from the Blue Mountains, NSW, mostly listens to airband comms but would also like to know the police frequencies for his area.*** The police have four frequencies for the Penrith/Blue Mountains region — CH. 8 468.025 PENRITH, CH. 21 468.350 KURRAJONG, CH. 43 468.900 SPRINGWOOD, CH. 56 469.225 KATOOMBA.

## MORE ABOUT CAD

***Last issue an Adelaide reader expressed dismay at VKA introducing Computer Aided Dispatch to its radio network.*** I am informed by my South Australian contact that only Adelaide will be effected by CAD. Mainly due to cost, the remainder of the state will be CAD free. My contact goes on to say, that the CAD unit will be portable. When an officer leaves the motor vehicle he or she will be able to carry the computer. While on the subject of the South Australia Police, the change-over from their 73 MHz system to the 169 MHz network is nearing completion. Sources within the department stated, "it will mean a vast improvement for country police, allowing state-wide coverage". More on this later...

## VKA RADIO CODES

***Here is the last installment of VKA radio codes.***
**601=DRIVE UNDER INFLUENCE, 602=PRESCRIBED CONCENTRATION ALCOHOL,**
**603=TRAFFIC BREACH, 604=STOLEN VEHICLE,**
**605=INTERFERE M/V, 606=ABANDONED VEHICLE, 607 TRAFFIC LIGHTS U/S, 608=TRAFFIC HAZARD,**
**701=BUILDING FIRE, 702=GRASS FIRE, 703=VEHICLE FIRE, 704=RUBBISH FIRE, 705=FENCE FIRE,**
**801=POLICE IN DISTRESS, 802=BOMB REPORT,**
**803=ANIMAL INJURED, 804=ANIMAL STRAYING,**
**805=MISSING PERSON, 806=CONVEYANCE**

## NEW ZEALAND POLICE PLANS

***From across the Tasman, Stephen tells us that the New Zealand Police, who have used 75 MHz AM for their communications, are planning to convert the system to FM...also, Traffic Officers will vacate the 82 MHz AM channels for the police 75 MHZ FM.*** Stephen will give us more information relating to the 'Land of the Long White Cloud' in future. If New Zealand readers have any questions or news they would like to contribute, please write to Scanning Action at the address given.

## SHEPPARTON FREQS

***John, in Shepparton, VIC, supplied a few of the more interesting frequencies for his area*** — 490.725 Driver Education Centre, 413.225 Ambulance, 162.760 GMV 6 television station, 500.100, 500.125, 500.175, 500.200 Telecom linesmen and technicians.

## ALBANY FREQS

***Albany, WA, is where Ian listens to the police on*** 79.135 (Albany), 79.255 (Mt Barker), 79.225 (Denmark), 79.195 (Denmark to Walpole), 79.375 (Albany Highway). The Albany ambulance uses 80.550 for general dispatching, plus 168.280 for hospital to ambulance comms. For fire brigade traffic he tunes to 76.460. He says he has logged some interesting transmissions on 499.000, however, he can't ascertain their origins. Ian, try 493.800, the repeater output of the frequency you mentioned. I think you will find the user is Burswood Island Resort, callsign VH6DNL.

## GEELONG FREQS

***Moving back east, Ross, in Geelong, VIC, wrote to inform readers that VKC uses 168.250 and 467.850 in the Geelong area.*** The Country Fire Authority can be heard on 163.330 in the city and 163.150 in the Geelong district. Ambulance services have 76.670 for their main communications, with the SES being heard on 468.650.

## TASMANIAN BAN???

***A letter from Gordon, in New Norfolk, TAS, expressed some concern over moves by the Tasmanian Government to ban scanners and other 'listening devices'.*** If anybody has further details regarding the pending legislation, please let us know here at Scanning Action. It will be interesting to see the goverment's definition of 'listening devices'.

## AMBULANCE COMMUNICATIONS

***For those into ambulance communications, Adam, in Bellevue Heights, SA, sends in the following frequencies for St John*** — 159.070, 159.600, 159.250 as well as 471.325 in Adelaide. In country areas it has 159.190 and 159.280. Adam also discovered the police on 169.780 MHz. As the South Australian Police have largely abandoned the mid VHF 73 MHz allocations in favor of 169 MHz highband more and more transmissions will be heard up there. The highband VHF is repeater based and will be statewide.

## MURWILUMBAH/TWEED FREQS

***Bradley, in Kiel Vale, NSW, is thinking about buying a portable scanner and would like a selection of frequencies for his area.*** Brad, the police in the Murwillumbah/Tweed region use 84.000 MHz, or for UHF-only cars 468.825 MHz. The NSW Fire Brigade can be monitored on 78.055 MHz, pumpers from 391 Station Murwillumbah, 468 Station Tweed Heads and 347 Station Kingcliff are the main units surrounding you. Ambulance communications can be heard on 76.670 MHz, and finally Bushfire Brigades use 72.635 for joint Tweed/Byron operations.

## HELP — SYDNEY!

***Reader J. Henry, from Sydney, would appreciate some help identifying a host of government users on the***


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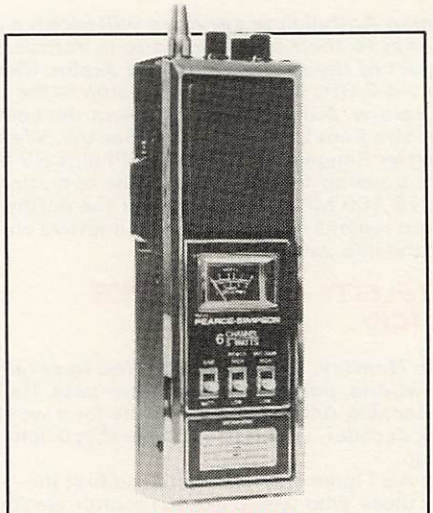

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RUSSELL BRYANT'S

# SCANNING ACTION

(continued)

***following frequencies*** — 78.850, 83.745, 173.790, 463.175, 463.450, 463.650, 463.900, 487.200, 490.975, 493.025, 508.275. If any reader can identify the services using any of the frequencies, let us know so we can pass them on to Mr Henry.

## BOWEN/TOWNSVILLE FREQS

***A reader, from Currajong, QLD, sent in a list of frequencies for the Bowen and Townsville areas.*** For Bowen the SES uses 468.650, Fire Brigade 74.060, Police 77.420, Hospital 82.815 and Bowen Shire Council 74.495. The Townsville frequencies are Railways 168.520, 168.565, 168.640 and 168.775, SES 468.600 and 468.650, Fire Brigade 74.120, Police 77.450 and 77.480, Ambulance 82.920 and finally the City Council 84.000 MHz

***Several issues ago Gary, in Tanilba Bay, NSW, wrote requesting the frequency of the SNP Security Service used in and around the Newcastle area.*** A letter from Geoff, in Newcastle, states that the SNP uses 170.175 MHz.

## NEW TASMANIAN COMMUNICATIONS

***Tasmanian Ambulance services will receive a much needed boost to their communications across the northern part of the state, explained Jason.*** Messages will now go via a 4.2 GHz link from Launceston to the transmitter site at Mt Barrow. A digital link will select the best transmitter site from Launceston, Mt Barrow, Weldborough Pass or Dazzler Ranges. From there, a Philips RV 900 voting base will re-transmit the message on the operational frequency, 78.160 MHz. Coverage over the northern and north eastern regions of Tasmania will improve considerably. Thanks for the info Jason.

## WX SATELLITE FAX DECODER ...BE QUICK!

***Kerry, in Heatley, QLD, is interested in satellite communications, particularly weather sats.*** He has supplied Scanning Action with the plans for a weather satellite fax decoder, which is available if you send me a $1.00 stamp.

Be quick AS I have only 10 copies, so first in — first served. For those who would like to monitor weather satellites, here are a few of the frequencies Kerry supplied — 150 MHz Japanese Data Sat, 136.320 GEO 53, 137.850 Meteor Sat 1,2,3,5, 137.400 Cosmos 3, 136.800 EGR Sat 13, 136.500 Nimbus Sat 4, 137.500 NOAA 1,6,8, 137.620 NOAA 8 and 11, 137.770 NOAA 7. Any good external antenna will do the job, however you will need a scanner with WIDE band FM capabilities.

## WHY...?

***Why did I print the repeater input frequencies in a recent Scanning Action, asks Kevin, in Reservoir, VIC.*** Kevin, on a day-to-day basis there is probably no need to know the repeater input frequency, with a few exceptions. Some scanner owners may not be aware of how the bands are divided into frequency groups and they may spend many hours monitoring the inputs trying to figure out who is on the air. (As demonstrated elsewhere in this column, with a letter from Ian, in Albany.)

Repeater inputs are the frequencies on which the cars transmit. Most mobile radios are 25 watts, as opposed to the base radios which are around 50 to 75 watts. For example, you hear a transmission on an input, with a simple addition or subtraction you have the output with no guesswork involved.

Another exception is that some radio systems don't re-transmit the cars on the output frequencies like the police, so in order to hear the mobile it is necessary to know the input.

A third reason and the one which I consider to be the most important...sometimes the police reverse the normal channels so that the output becomes the input and vice versa. The hobby of scanning is like a jigsaw puzzle, little pieces go to make up the whole picture. Repeater inputs, PL tones, channel numbers and radio codes are all part of that picture.

## BOOKS

Take a trip to your nearest airport on any weekend, there you'll discover a group of enthusiasts who use scanners as a means to put themselves alongside the pilots, air traffic controllers and flight service officers working the field. Airband monitors take their hobby seriously and there is no better authority on the airbands than journalist Bob Bell.

Author of a new book, "The Australian Airband Guide", Bob takes the reader through the terminology of flying, often the greatest hurdle monitors face. He then discusses the types of communications found on the bands, HF, VHF and UHF...all of which are explained in easy-to-read, non-technical terms. Not being an airband enthusiast, I found the text detailed, yet light, with little left to this reader's imagination.

The Airport Frequency Directory is the most detailed of any airband guide on the market. It is divided into two sections — main airports and secondary fields. Details such as airport identification codes, elevation above sea- level, runway locations, ATC and FIS frequencies, beacons, automatic terminal information channels, along with important notes pertaining to the airport are contained. Taking Bankstown, NSW, as an example, the Australian Airband Guide tells the reader that, "a large community of rabbits inhabit the field". Other, or smaller airports, include most regional fields, as well as those servicing larger country towns.

Frequencies associated with aircraft before and after their flights are also given. Commonly known as 'company channels', they can be found in the VHF airband, VHF land mobile also the UHF land mobile services. For those interested in monitoring the military side of aviation, a large section is devoted to the RAAF and Army company frequencies. RAAF callsigns and aircraft types are also listed.

Details of worldwide HF frequencies, aircraft selcal codes, space shuttle, satellite comms, plus OTC's Skycomms phone patch service are also published. For the enthusiast and casual listener alike, the Australia Airband Guide by Bob Bell is a true text book of Australian and worldwide aviation. With a recommended retail price of $24.95, plus $3.00 certified post and handling to anywhere in Australia, I would recommend the book to anyone even remotely interested in airband communications.

If you would like a copy of the Australian Airband Guide, I have one to give to the writer of the best letter received. Please indicate somewhere in the letter that you are interested in airband comms.

## PROPAGATION

Tacticians say "that the best form of defence is offence". It seems that Ace Communications subscribes to that adage. After coming second in a recent court battle against consumer radio giant Uniden, Ace has fought back, summonsing the maker of Bearcat scanners for alleged violations of Antitrust laws. Basically Ace is saying that not all of Uniden's patents are applicable to AOR scanners, further, that they (Uniden), are attempting to drive any remaining competition out of the market.

Uniden scanners account for over 80% of scanners sold worldwide. In the original court action Uniden sued Ace for seven patent infringements in AOR scanners. Ace denied the plaint, stating that originally Electra, and now Uniden, had abandoned the patent by nonenforcement.

This may seem a trivial matter, however, think of the possible ramifications...the cost of scanners will increase dramatically because of royalties paid to Uniden, or alternatively, you can purchase any scanner you like, just as long as it is a Bearcat.

## *PRO 34 MODIFICATION*

Last, but by no means least, a mod for PRO 34 handheld scanner owners. It allows manual selection of AM on mid and high band VHF frequencies. Users of the PRO 34 will known that AM is currently restricted to the VHF aircraft band. Installation of the mod involves a gentle touch and a steady hand although, otherwise is not that complicated. If you would like a copy send a stamped, self-addressed envelope to the usual place.

## *APOLOGY*

In the last issue of Scanning Action I mentioned that AOR had decided to drop its AR 3000 super scanner. **WRONG! WRONG! WRONG!**

After that item appeared, I was contacted by Rudy Bresnik, Managing Director of Emtronics, the 'OFFICIAL' Australian AOR agent. Rudy explained the situation regarding the 3000 saying that there had been three manufacturing faults, however, all have been rectified. He is anticipating that regular supplies will be arriving around September and will be available from Emtronics. Previously, demand had outstriped supply with the few that did make it into the country being distributed to government departments and long-term customers of Emtronics. CBA is sorry for any inconvenience caused to Emtronics or that company's customers, however, the information was published in good faith in the belief that the rumor was correct.

That about wraps it up for another issue. Remember New Zealand readers, we are looking for input from you. The address to write to is:

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ROSELANDS NSW AUSTRALIA 2196.

For personal replies please include a stamped self-addressed envelope.


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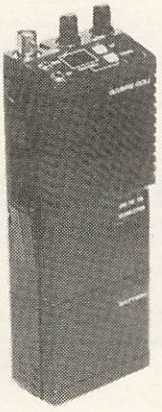

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| **SCANNER FREQUENCY LIST**<br>SA & NT<br>VIC & TAS<br>NSW & ACT<br>QLD<br>W A<br>VHF, UHF AVAILABLE IN FREQUENCY ORDER OR NAME (alphabetical)<br>**$29.95 inc P&P** | ALI new HF, VHF, UHF emergency services guide. This new list gives all emergency service on MF, VHF and UHF for all of Aust in one booklet.<br>**$45 incl P&P** |

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## Russel Bryant provides the inside frequencies for the . . .

# BATHURST 1000 CLASSIC

The October 1990 long weekend signals the start of the 28th Bathurst 1000 car racing classic. However, in the days preceeding the big race, there is already a large number of people trackside, all working to prepare the circuit for raceday. As always, Channel 7, Sydney, will be there to provide not only Australia, but the world, with first class coverage of the event.

Approximately 1,250,000 people will watch the race live across Australia, together with an estimated 300 million overseas viewers. Over 30 cameras will cover the event, with 22 being located beside the 6.213 kms of track. The remainder are to be fitted to cars, drivers and pit crews. This will present images of the race not only from a driver's point of view, but also the pit bosses, team managers and mechanics. In 1989 a camera, located on ConRod straight, was fitted with a radar gun which timed passing cars at 260 km/h.

Twelve Channel 7 technicians will begin laying hundreds of kilometres of cable, a week before the race begins. Four outside broadcast vans are used to cover the course, as well as the now famous Channel 7 helicopter-cam. The task of assembling and maintaining a constant quality picture to the viewing audience, requires a massive behind-the-scenes' effort on behalf of television crews.

Co-ordination of camera operators, sound personnel and technicians is via two radio frequencies in VHF, UHF and SHF bands which are used extensively on and around the track. Here are some of the VHF/UHF frequencies and their users.

**463.200 OUTSIDE BROADCAST CH. 1 LOW**
**463.475 OUTSIDE BROADCAST CH. 2 LOW 473.375 OUTSIDE BROADCAST CH. 2 HIGH**
**472.800 CROSS BAND AUDIO 477.250 MAINTENANCE CONTROL SIMPLEX**
**471.125 OPERATIONS SIMPLEX 414.575 PRODUCTION DUPLEX**
**427.212 PAGING SIMPLEX 471.125 COMPUTER ENGINEERING CH. 1**
**470.725 COMPUTER ENGINEERING CH. 2 166.030 O B CH. 2 HELICOPTER**
**165.640 ENGINEERING CONTROL 471.125 EQUIPMENT SECURITY**
**470.725 EQUIPMENT SECURITY 473.375 DIRECTOR HELICOPTER**
**479.125 RACECAM SIMPLEX 472.275 PROIMAGE DUPLEX**
**472.175 PROIMAGE SIMPLEX 478.000 AUDIO**
**470.125 OPERATIONS 470.725 OPERATIONS**
**463.200 FLOOR MANAGERS 469.575 PITS RUNNERS**
**469.975 PITS RUNNERS**

***RACING TEAM FREQUENCIES***

**168.550 CROMPTON HOLDEN DEALER TEAM**
**166.510 CROMPTON OPTION 450.300 PETER BROCK**
**450.450 PETER BROCK 471.525 PETER JACKSON NISSAN TEAM**
**471.775 MICHAEL PRESTON RACING 471.900 JIM RICHARDS**
**472.025 DICK JOHNSON 484.875 JOHN GOSS RACING TEAM**
**484.975 PETER JACKSON NISSAN RACING**

***TRACKSIDE CAMERA NUMBERS AND POSITIONS***

**1=HELL CORNER, 2=MOUNTAIN STRAIGHT, 3=GTX BEND 4 and 5=BP CUTTING, 6=REID PARK, 7=CASTROL CURVE**
**8=SULMAN PARK, 9=MCPHILLAMY PARK, 10=CASTROL TOWER 11=SKYLINE, 12=THE DIPPER, 13=THE ESSES**
**14=FOREST ELBOW, 15 and 16=CONROD STRAIGHT**
**17=BRIDGESTONE BRIDGE, 18=MURRAYS CORNER**
**19=HELICOPTER, 20=FINISH LINE (PIT STRAIGHT) 21 START LINE (PIT STRAIGHT), 22=PIT CAMERA.**

Not all communications from cars to their crews is voice. The sophistication of today's racing car requires that all vital components and functions be monitored by computer. In order to keep mechanics and pit crews advised of a car's progress, drivers have fitted telemetry devices to the vehicle's computer. Data is continually transmitted to and from the car, checking manifold temperatures, oil pressure plus a host of other areas of engine performance. Obviously some of the driver frequencies listed above will be telemetry channels, some will carry both voice and data so it will pay to monitor all driver frequencies just in case.

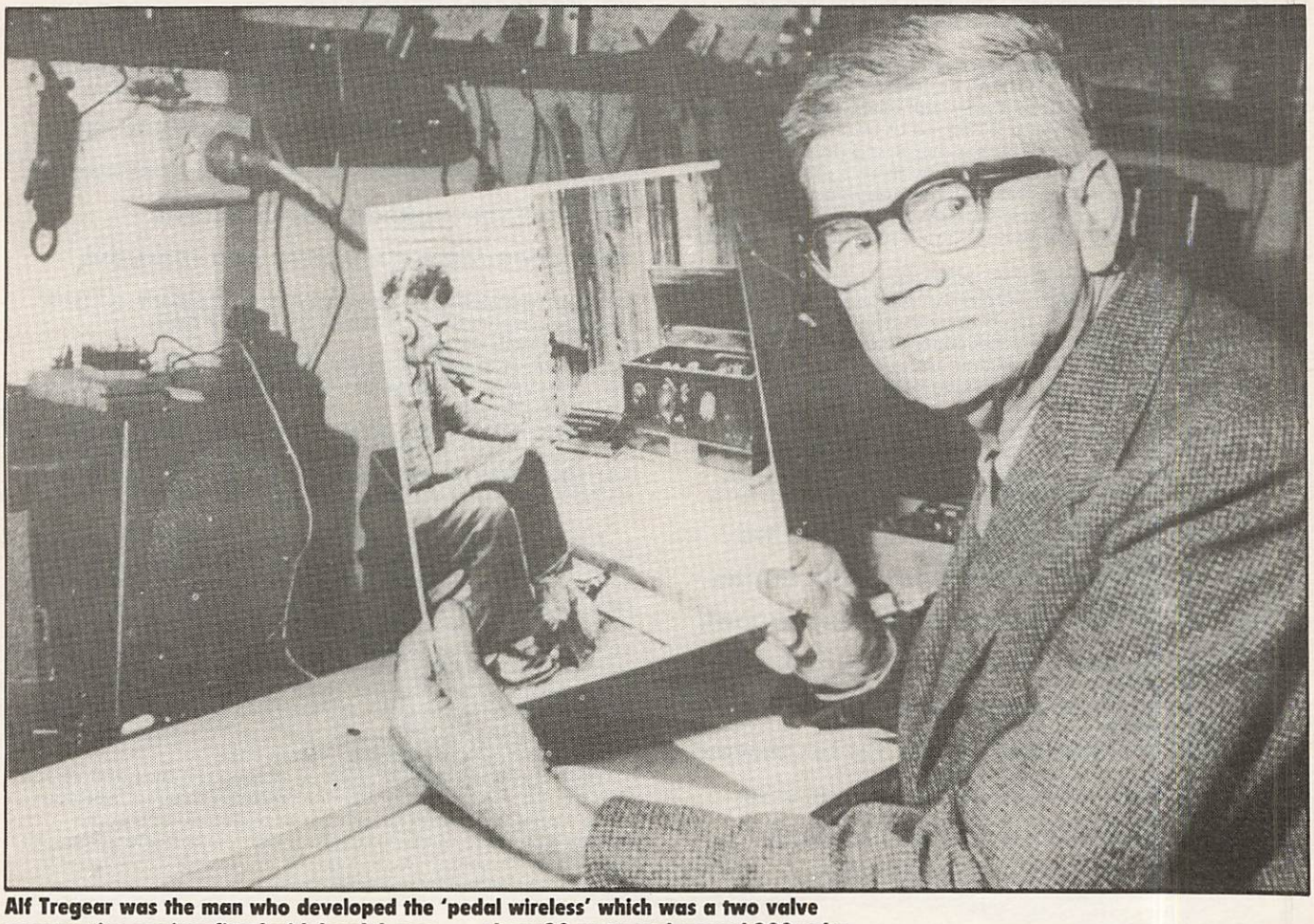
With the amount of RF floating around the Bathurst circuit, don't be too upset if your scanner refuses to scan. Spurious radio signals are emitted by a lot of the video and audio equipment, so it can be expected, that even those scanners with superior selectivity as well as improved IF frequencies will be overloaded by spurious noise.

# DX THE FLYING DOCTORS

**The Royal Flying Doctor Service is a part of outback life, here's how to**

**DX THE FLYING DOCTORS**

**By ROB WILLIAMS**



**Alf Tregear was the man who developed the 'pedal wireless' which was a two valve regenerative receiver fitted with headphones . . . about 20 watts and around 300 volts.**

**We've all watched the top-rating 'Flying Doctors' serial on TV's Nine Network and seen the extensive use they make of two-way radio ... but, did you know that you can hear broadcasts from the RFDS (Royal Flying Doctor Service) throughout Australia? Well keep reading, because we're going to give you an insight into the RFDS and how you can join the thousands of country folk who listen every day to this vital link with the outside world.**

## 'FLYNN OF THE INLAND'

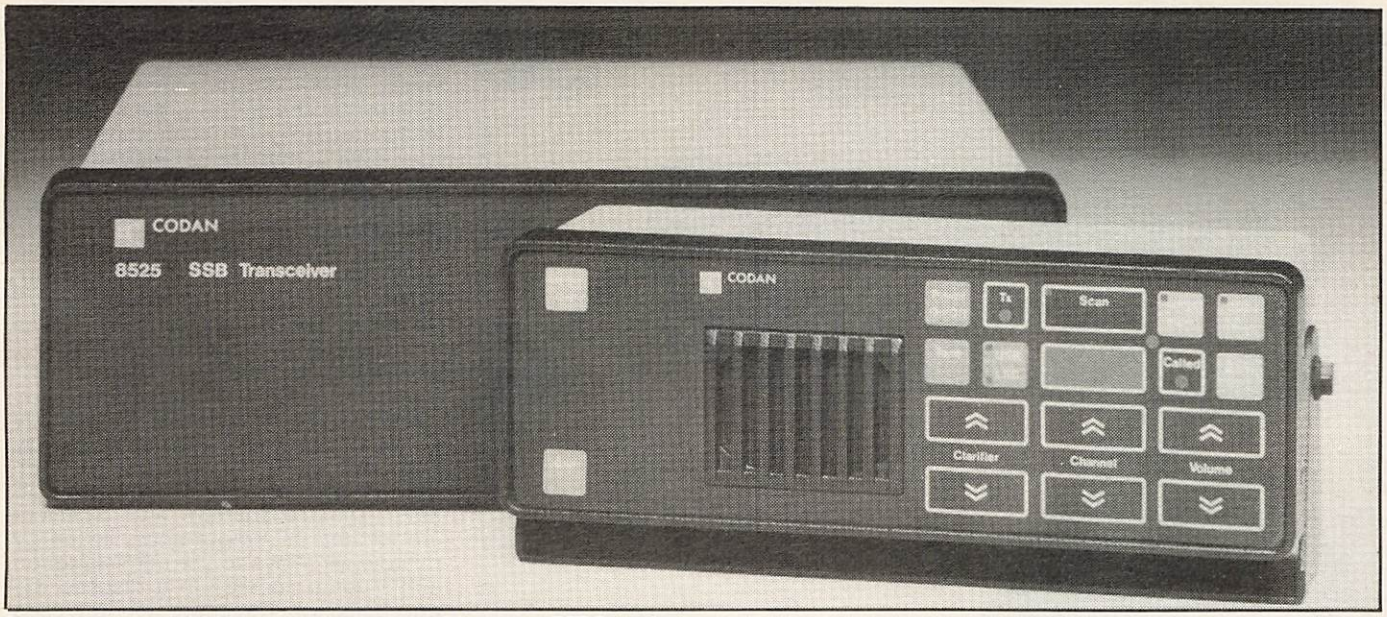
The original concept of the RFDS began in 1902 with the determined efforts of John Flynn, a Reverend with the Presbyterian Church. Working in the outback, he considered the vast distances and loneliness between country properties and saw the need to establish outback medical centres.

John Flynn was a man of great vision and he soon saw the only way to bridge the gap between homesteads was through a new invention, the aeroplane, which had already begun a glorious career confirmed in World War I, but, the aircraft alone was not enough. People still needed to communicate, easily and reliably, over the vast distances that separated outback properties from the nearest city or township.

Flynn found the answer in that other new creation, the wireless, but, unlike most radios then available, the requirement was for a special model which would have to be compact, inexpensive and above all easy to use — 'simple enough for women to operate'.

To design such a radio Flynn turned not to the professionals and engineers but, to amateur experimenters such as Alf Tregear, who developed the 'pedal radio' — a simple but rugged transceiver powered by the pedalling of the operator or an unlucky bystander. This unusual way of powering a set was necessary because in the mid-20s there were no 240 volt power points on the outback stations; domestic electricity was yet another new-fangled invention with what little there was confined to the big smoke.

1928 saw the establishment of the first RFDS base, at Cloncurry, north-west Queensland. The site was chosen because of a central location which al-




**Remote mounted SSB transceivers are used by many RFDS stations.**

lowed it to be heard throughout Queensland, the Northern Territory, NSW and South Australia.

Early homestead transmitters used a two valve regenerative receiver fitted with headphones. The pedal-generator fired the 20 watt transmitter with around 300 volts. Years later, a keyboard was developed which translated keystrokes into morse, thus relieving country folk of the necessity to learn code. Today there are some 10,000 RFDS transmitters scattered around Australia and for many the network has become their most important means of communications.

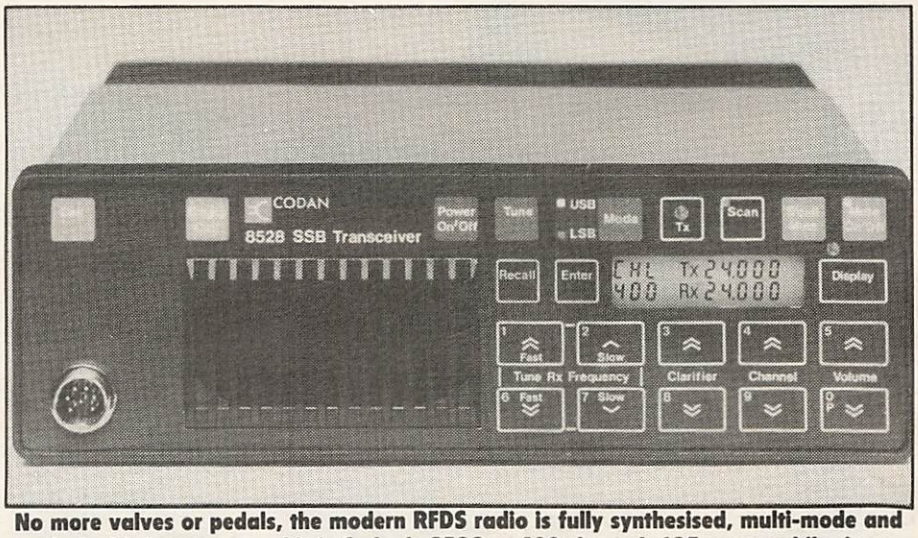
The objectives of the RFDS was now reached, to serve people in the outback wherever there was/is no existing medical practices. This non-profit organisation was a unique Australia service, other countries have emergency medical services, but, nothing like what was to be found in Australia. By picking up your radio you could be in contact with immediate advice and, when necessary, medical assistance could be flown in.

This is what country people needed the most, to be able to get assistance in times of emergency.

## THE MODERN DAY RFDS

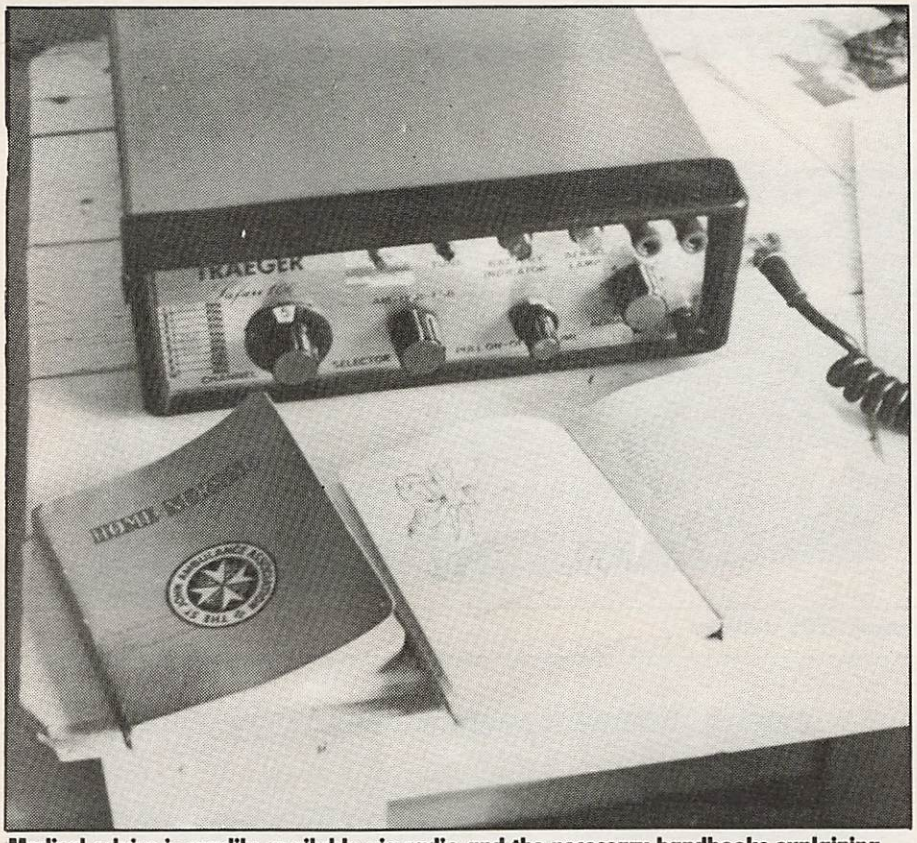
Today's RFDS is a far cry from Flynn's fledgling network — it's a well-tuned organisation covering isolated outback communities around Australia with 11 outpost stations and 28 aircraft flying more than 5 million kilometres and carrying some 10,000 patients to hospitals every year.

Aircraft are always on call and can be on their way within twenty minutes, ready to airlift a sick or injured patient to the nearest medical centre and doctors monitoring the RFDS channels are on hand around the clock. Regular medical radio services operate several times each day, providing instant assis-




**No more valves or pedals, the modern RFDS radio is fully synthesised, multi-mode and packed with features . . . this is Codan's 8528, a 400 channel, 125 watt mobile rig.**

**School of the air is a daily feature of a child's life in the outback and has been for many years.**




**Medical advice is readily available via radio and the necessary handbooks explaining the medical procedures and diagnosis.**

**TV viewers will be familiar with the Nomad, an ideal aircraft for the RFDS.**

tance to those in need. Yet all this is done at no cost to the user. The RFDS not only handles emergencies from people living in the country but, also from the thousands who traverse outback Australia.

If you intend travelling across the continent you would be wise to hire an RFDS radio to give you that extra peace of mind knowing that you will never be out of touch in case of an emergency.

One of Australia's leading manufacturers of RFDS HF transceivers is Codan, whose range stretches from a portable sideband unit to a fully synthesised remote mounting mobile and desktop models with up to 400 channels and 125 watts output. Equipment such as this provides a complete communications link when you're 'outback' because the RFDS has three additional elements to its operations.

Firstly, it provides a point for interconnecting radio 'phone patches' or Radphone calls into the public telephone network and also dispatches telegrams. Revenue from these services are a mainstay of RFDS funding, along with Government assistance and public donations. The RFDS also has a regular 'clinic' where people can call and ask for medical advice on a wide range of topics. Part of this is the 'bush pharmacy', a community medical chest which contains over a hundred bottles of potions and tablets. Each bottle is numbered, so across a two-way the doctor only has to give the bottle number and correct dosage to the patient. Finally, the RFDS radios are used by the 'School Of The Air' to provide children in the outback with school lessons in their own home. Many families tune in each day, their kids becoming part of an on-air classroom stretching across the country.

From pedal-power to the latest in solid state transceivers, radio communications is of course the backbone of the RFDS. Station VJC at Broken Hill is a typical RFDS installation with Codan 1 kW SSB units which can operate over frequencies anywhere between 2 and 12 MHz and provide a reliable coverage of over a thousand kilometres by day and more at night. VJC has five such radios used for the SOTA and RFDS nets. The transmitters and receivers are located at remote sites, linked by microwave relays to the administration and studios (located in a disused airport building). The entire network uses many frequencies throughout the HF spectrum. The lower frequencies are used close to town, with higher allocations for distant homesteads. The accompanying table lists frequencies and schedules for all known RFDS services, including some VHF channels used in major centres.

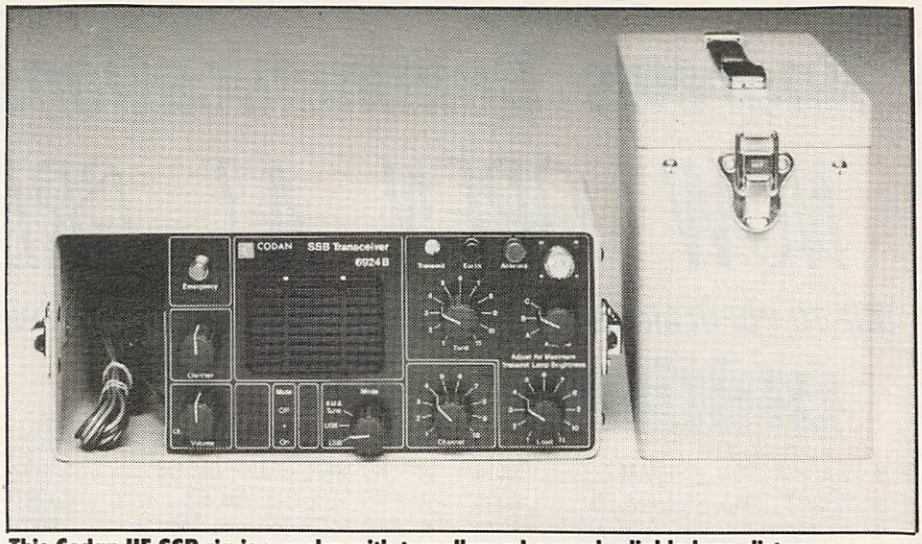
Like many users of HF radio the RFDS have announced plans to employ the new technology of Aussat satellites. In 1992 the 'L band' satellites will allow Australia-wide mobile communications via satellite direct from RFDS medical personnel to any base. The facility will not only provide near-instant consultations but, also rapid transmission of crucial medical data such as ECG and EGG, computer records and facsimiles. With new satellite receiving dishes fitted to aircraft, staff will be able to utilise the L-band services while airborne, saving valuable time through immediate action in any emergency.

**The early days . . . while daughter pedalled, mum did the communicating.**

I'm sure you will agree with me that the Royal Flying Doctor Service remains a vital part of life in our vast continent and is a tribute to the vision and ingenuity of Australians.

## WHERE AND WHEN TO LISTEN

The following table lists all you need to know to listen into the RFDS. It includes hours of operation for weekdays (M-F) and weekends (S-S) — the definition 'UTF' means 'until traffic is finished'; frequencies for the School Of The Air (SOTA), telegrams and medical assistance (TG/MA), telephone connections (PH) and also known VHF and UHF channels for local scanner users. An asterisk (*) marks services not provided by a station. Note that VKF Wyndham is a remote receive-only site controlled from VJB Derby. VIO Broome and VIH Hobart are part of OTC's Coast Radio Service but, also provide outback HF communications.




**This Codan HF SSB rig is popular with travellers who need reliable long distance communications in the outback.**

| STATION | CALL | M-F | S-S | SOTA | TG/MA | PH | VHF/UHF |
|---|---|---|---|---|---|---|---|
| Broken Hill | VJC | 0700-1900 | * | 4635, 5130 5735, 5895 6920, 7565 | 2020, 4055 6920 | 4055 6920 | 485.2 |
| Cairns | VJN | 0800-1700 | 0800-UTF | 5300, 5865 7465 | 2020, 2260 5145, 5300 7465 | 4880 4926 6866 6785 | 70.130 |
| Charleville | VJJ | 0800-1700 | 0830-UTF | 4045, 4980 5227, 6845 6945 | 2020, 4980 6845 | 7307 7410 | 70.130 |
| Mt Isa | VJI | 0800-1700 | 0800-UTF | 5445, 6965 7803 | 2020, 5110 9695 | 7475 7392 | 70.130 |
| Port Augusta | VNZ | 0800-1700 | 0900-1100 | 4010, 5145 5845, 6890 8171 | 2020, 4010 5145, 6890 8165 | 4010 6890 8165 | 166.03 |
| Alice Springs | VJD | 0700-1700 | 1000-UTF | * | 2020, 4350 5410, 6950 | 5410 6950 | |
| Alice Springs | VZ8BZ | 0830-1510 | * | 5340, 5370 8035 | * | * | |
| Katherine | VZ8SK | 0800-1615 | * | 4860, 5731 7340, 8014 | * | * | |
| Darwin | VJY | 0800-2400 | * | * | 2360, 4010 6840, 7975 7975 | 4010 6840 | |
| Carnarvon | VJT | 0700-1700 | 0800-0900 | 4045, 4926 5230, 6890 | 2020, 2280 4045, 6890 | 4045 6890 | 129.6 |
| Meekatharra | VKJ | 0645-1715 | 0900-1000 | 4010, 4880 5260, 6880 | 2020, 2280 4010, 6880 | 4010 6880 | 129.6 |
| Port Hedland | VKL | 0700-1700 | 0830-0930 | 4030, 6960 | 2020, 2280 4030, 6960 | 4030 6960 | 129.6 169.27 |
| Derby | VJB | 0700-1600 | 0900-0930 | 5200, 5300 5850, 6925 | 2020, 2792 5300, 6925 | 5300 6925 | 129.6 158.23 |
| Wyndham | VKF | 0630-1615 | 0830-0845 | * | As VJB | As VJB | As VJB |
| Kalgoorlie | VJO | 0715-1700 | 0900-1000 | 5010, 5360 5740, 6825 | 2020, 2656 5360, 6825 | 7550 8144 | 129.6 469.45 |
| Broome | VIO | skeds 0600 0900 1200 1500 1800 | * | * | 2760, 4940 | * | |
| Hobart | VIH | skeds 0930 1200 1530 | as M-F | * | 5355 | * | |

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- ★ PC.122, Popular SSB/AM CB .....$229
- ★ PRO 640E New SSB/AM CB .....$299
- ★ HR 2510 10m ALL-MODE.....$579
- ★ PRO 540E Deluxe AM CB .....$189
- ★ PRO 520E Top AM CB.....$129
- ★ PRO 510E Compact AM CB.....$99
- ★ PRO 500D Economy AM CB.....$69
- ★ Sea Dolphin $149, Sea Wasp $179, Barracuda $249

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*HF 100W AM/200WSSB O/P, 4 pwr. levels, rx. amp. linear.*

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- ★ HL.63U, 60W UHF linear w/adj. GaAsFET (MGF.1202).... $429
- ★ HL.130U Auto-drive 120W UHF Linear (MGF.1202) rx..... $699

New HL.250UDX coming. Tube type linears available too.
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COMPARE & SAVE

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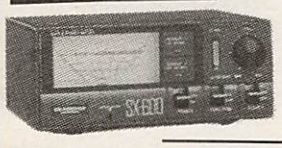
- ★ KR-250, Hi quality.....$199
- ★ KR-400, Medium duty .....$379
- ★ KR-400RC Round Cont.....$429
- ★ KR-800S Heavy duty.....$549
- ★ KR-800SDX, adj. speed.....$649
- ★ KR-1000S Extra h.d. .....$649
- ★ KR1000SDX adj. speed.....$749
- ★ HR 1300 Super h.duty .....$849
- ★ Top & bottom Clamps inc w/most
- ★ KP-760A speech process..$199

DIAMOND ANTENNA



## RF/SWR METERS *Made in Japan*

- ★ SX 100 1.6-60MHz, 3kW...$219
- ★ SX 200 1.8-200MHz .....$169
- ★ SX 400 140-525MHz .....$189
- ★ SX 600 1.8-525MHz .....$279
- ★ SX 1000 1.8-1300MHz .....$349
- ★ SX 2000 Auto, 200MHz.....$229
- ★ SX 9000 Auto, 1.3GHz.....$399

## DIAMOND SUPER HI-QUALITY SCANNER ANT'S.

- ★ D130E 25-1300MHz DISCONE, "The Best" ..... $149
- ★ D707E Active Antenna 0.5-1500MHz..... $199
- ★ DUALBAND 144/477MHz base verticals coming
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REVEX SWR/RF WATTMETERS from only .....$89
GOOD quality low cost 27MHz SWR meter. metal .....$29

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- ★ ELECTR. TX-472S ..... $399
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Other UHF tranceivers available at best prices.

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WHY PAY MORE?

- ★ CP-3000 w/answer.....$1400
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ALL include on-site installation metro. SYD/MELB.

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- ★ STATION MASTER.....$59
- ★ MEGATRON, New .....$79
- ★ ALINCO DM.130MVZ.....$479
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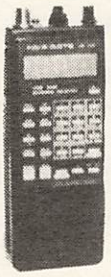
## $649

**SUPER WIDE BAND SCANNER**

Receives from 100KHz-1300MHz AM/FM/FMW 100ch memory (don't pay $725)

## FAIRMATE HP-100 $529



HF UP CONVERTERS.....$179ea.

Covers 8-600, 805-1300MHz Incredible 1000ch. memory! Importer

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Improved Model

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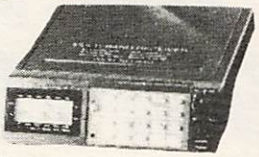

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## YUPITERU MVT-6000

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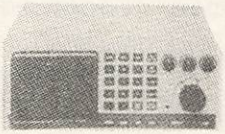

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AM/FMN/FMW scanner 100ch.

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## UNIDEN SCANNERS

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Features built-in microprocessor, group/open channel scanning, memory protection. Made in Australia.

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- ★ TX.826 AM DELUXE MOBILE CB .....$119
- ★ TX.821 ECONOMY AM MOBILE CB.....$99
- ★ PSA.1210 11A p/supply.....$189
- ★ PSA.1225 35A.....$429
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FAX: (02) 688 4301 manual

***To buy or not to buy ... If you've been thinking about buying your first scanner, or trading 'old faithful' in for a newborn rig fresh from its styrofoam womb, every month sees the decision become more daunting and the choice more tempting.***

# DO YOU NEED A SUPER SCANNER?

**Times have changed for the scanner enthusiast. The only choice used to be between 10 channels and 50 and whether you really needed the VHF air band. Enter the Realistic PRO-2004, with 300 channels and continuous coverage of 25- 1300 MHz in their most popular desktop model — the first affordable 'super scanner'.**

Then followed a rush of models, some with up to a thousand channels and others with frequency coverage reaching down into the HF bands. All this has been capped off by Icom's new 'DC to daylight' models, the R-1 and R-100.

Duncan Baxter, that bearded gentleman's gentlemen who heads Icom Australia, will no doubt chastise me for referring to his new products in the same sentence or even on the same page as the term 'super scanner'. He would prefer a tag of a higher calibre, something along the lines of 'professional HF/UHF receiver'. Accurate and descriptive this may be, but it has not the catchy lilt of 'super scanner'. By any name, the children of this new generation of radio have broken all the rules we've grown to respect. Rules such as one band per radio, rules of size and performance, rules that made 30 MHz the border between shortwave and scanners and followers of both. But, if the Berlin Wall can crumble, why not the barrier of 30 MHz?

## MORE FOR YOUR MONEY

This more than anything else is what the new receivers are about, giving you more megahertz for your money. They also give you added features and modes. Yet at the same time a traditional 3-band handheld scanner might be all you really need, as might a cheap second-hand shortwave set. Either would cost you around $350. This is perhaps half or a third the price of a super scanner. Are the new radios really two or three times as good...this is the question a great many buyers will be asking.

It's not as if you are considering a receiver such as the Icom R-9000, almost God-like in its capabilities and costing as much as a small car. What used to be the top shelf gear is now the average entry point, while many of the super scanners become decidedly affordable (although it may take a bit of saving to get there).

They can be considered alternatives to the usual gear and attractive ones at that. It is pointless to compare them to lesser radios because, to bastardize a noble saying, it is not what the receiver can do for you but, what you want to do to the receiver. It is your own needs that set the standard, no matter how enticing the brochures and spec sheets may be...why pay for a feature you'll never use ?

## THINK BEFORE YOU BUY...!

There will be some who would buy such radios as the R-1 or R-100 as a reflex action. Probably with no more reason needed than that it is perceived as the best gear, or because it is the latest from Icom. To me this is usually one and the same. (Such people undoubtedly have money without limit and if they have any daughters I would like them to know that I am single and available).

Most of us, however, weigh our needs and wants against the prices. Take as your starting point the frequencies you'll want to hear. There is probably no synthesised scanner on the market that doesn't give the 3 basic bands — VHF mid and high bands and UHF.

Consider these as being 66-88 MHz, 144-174 MHz and 400-512 MHz respectively.

This is where most of the action is to be found. Throw in the 108-136 MHz air band and you've almost everything covered. In the big smoke, for the sort of scanner nut who would have been locked away in less enlightened times, this may not be enough. But, for most of us and for almost everyone outside the capital cities, it will do the job and do it well. In these circumstances all that a continuous coverage scanner will add to your listening pleasure is television sound and vision carriers.

## THE PRACTICAL ADVANTAGES ARE...

On the whole, the practical advantages of such a scanner are the VHF low band at 30-50 MHz, an interesting slice of spectrum but, more for the enthusiast than the day-to-day user; perhaps access to the VHF satellite frequencies, for which you need a good receiver, a better antenna and a few clues as to the right techniques; and maybe the VHF/UHF military aircraft allocation, which is a matter for the airadio buff. Even if you

extended this to include the ever-so-boring 800 MHz cellular carphone band (which is of course patently illegal to listen to), you can see that for the greater number of scanner-heads a desktop or handheld from the sub-$400 bracket is quite sufficient.

Secondly, consider your listening habits and from this the number of channels you need. I defy anyone outside of the cities to fill to capacity a hundred channel four-band scanner. I defy anyone in Tasmania to fill near capacity a fifty channel scanner on any number of bands.

The choice of channels must start with what you can program into them. For the very same reason I fail to understand the logic of any **super scanner** with less than a hundred channels, the models from Yupiteru and Icom being cases in point. My own scanner is a modest but capable Cobra SR-15 and its hundred channel cup almost runneth over with no more than the full UHF police band and local air and media channels.

So if I was to put up the cash for anything with extended coverage then I'd want extended channels into the bargain — the thousand on call from the AOR- 1000 handheld would do very nicely. I might never use them all, but, better too many then too few.

Some more on listening habits. Unlike Russell Bryant and Bob Lopaka, I'm not much of a 'frequency detective'. My scanner has cobwebs on the search key and does little more than keep an ear on my programmed memory channels. If you recognise something of yourself in this then a super scanner isn't really for you, unless your area of listening interest lies outside the limits of the conventional receiver.

## LET'S LOOK AT 30 MHz

Speaking of limits, let's look briefly at 30 MHz and all things below. As more and more scanners delve into the realm of HF they will at times be promoted, pushed and flogged as being the ideal replacement for both your HF receiver and scanner.

Sharing my RF attentions with the Cobra are two HF receivers from Sony. The ever-reliable 7600 portable is retained for monitoring sideband (mainly utilities, mainly aircraft). There's also the pocket-sized SW-1, which outside of listening to selected shortwave programs spends an embarrassing amount of time acting as travelling alarm clock and desktop AM/FM radio. Both units cover 150 kHz to 30 MHz, with the FM broadcast band thrown in (and in due time both will be replaced with the sideband-

***Realistic 2004 was one of the first super-scanners, 2005 is better again.***

equipped yet midget-minded SW-7600, when the first Australian shipment arrives). At retail prices, you will pay more for a SW radio plus the Cobra than you will pay for such as the Icom R-1 alone. At the same time the Icom handheld offers continuous tuning from 100 kHz to 1300 MHz. So in terms of both cost and frequency coverage the R-1 is two radios in one and then some.

## TWO RADIOS IN ONE...?

Now the old wives tale says that **you can't get one receiver to do the work of two,** that HF plus VHF plus UHF doesn't add to HF/VHF/UHF and still work just as well.

I side with the old wives on this one and remain to be convinced. In most instances I've seen of scanners trying to be HF receivers, it is the antenna that makes the radio. Unless you are using at the very least a telescopic whip, the scanner isn't even in the race; if a scanner is going to be touted as an all-band communications receiver then please give it a fair chance to prove itself, starting with a decent HF-capable antenna.

This is especially true of portables. You can achieve very respectable results with a long-wire, dipole or simple trap, but, all this takes away from the portability itself. None of this is a condemnation of feature-packed continuous coverage receivers. As scanners, in terms of performance, they can be brilliant. The R-1 can do very well, although hampered by a lack of memory channels and some compromises in selectivity. However, they really need to be partnered to a proper aerial before you can consider them HF receivers.

The MVT-5000 includes a telescopic whip for such use and through this it makes a good fist of it, so Icom and AOR should take note. None of these companies claim their super scanners will out-perform a dedicated HF receiver, so don't be led into thinking otherwise. What they can and do deliver is access to whole new vistas of spectrum which may be of interest, features which could well be useful, performance which almost certainly beats your present set-up. **In the final analysis, whether any of these is worth the money, is really up to you.**

***Latest kid on the block is IC R-100 (see review in this issue).***

# HF LINK

WITH ROB WILLIAMS

***Greetings once again to HF LINK. Well, winter is slowly leaving us and as we move into warmer months I'll bring your DX notes up to date with some of the latest news around the traps. In this issue we have more details on the SES frequencies, a look at America's Presidential HF network and some great news on a project you can all help with. Remember, all times are UTC, all frequencies in kHz, and broadcast stations use AM while utilities use sideband. So here we go.***

## MORE ON THE SES JIGSAW PUZZLE

***Nick from Aurukun,*** up there near Queensland's Cape York Peninsula, has sent a list of his local SES frequencies - 2566, 2575, 2575, 3735, 3743, 3746, 4576, 5833 and 9300, which is the primary channel for all communications with east coast SES regions. Another interesting service from the area is 5942.5, used by the Aurukun Community Incorporated for comms from remote homesteads to town. Thanks for those, Nick, and I'm sure there are more readers out there who will have some other useful frequencies to pass on.

## EMERGENCY SERVICES UPDATE

***During the floods earlier this year*** there were many times where HF communications were used exclusively to maintain links with the rest of Australia. Stories are still being told detailing frequencies that were used, so to update your lists in the event of another such disaster (although let's hope it doesn't happen again) here are some brief notes from Tony Wege of the Southern Cross DX Club ... VJJ, the Royal Flying Doctor base at Charleville, played an important role when that town went under. 4980 was used by many outback homesteads, all calling for help and food.

Also heard were the SES, on 5827 (day) and 3716 (night), involved in rescue and relief operations in Broken Hill, Cobar and Dubbo. Tony also reports that listening to RFDS frequencies is a good way of learning the situation in outback towns, particularly during floods and local crisis. Tony also suggests logging some of the truck channels used by large interstate rigs. Many of them carry HF radio as their standard means of communications back to base and they will be among the first to report major incidents — listen out on 6860, 5910 and occasionally 5945 for Queensland and NSW trucks.

WIN A
COBRA 148 GLT
SEE PAGE 65

While on disaster frequencies, regular HF LINK contributor Kelvin from Penrith NSW informs me that south-eastern Australia aero channels 5526 and 8876 carried a multitude of traffic working Dubbo airport during the floods. Kelvin noted several military helicopters communicating with Dubbo, which was the main rescue control centre for nearby flood stricken Nyngan. One callsign heard was 'Possum One', as yet we've been unable to identify to which squadron this callsign belongs, so maybe someone out there can help. I've had one suggestion that this call belongs to a trained team of 'rescue Possums' employed by Patrick McDonald's famous shortwave BBS — is this what your possums get up to at night, Patrick ?

## TIME RUNS OUT FOR VNG ?

***The continuing saga of VNG ...*** a letter to VNG from DoTaC indicates the station's temporary licenses for 10 MHz and 15 MHz will not be extended past November 30 this year. The 5 MHz transmissions will continue, subject to international agreement and a new allocation will be made in the vicinity of 16 MHz. This new service will also be run with the minimum power required for adequate coverage. The Department has received several complaints from other users of the bands that VNG's existing 10 and 15 MHz signals interfere with reception of US stations WWV and WWVH, which carry reports on weather and propagation as well as Omega navigation broadcasts. Some 50 or 60 Australian seismographic stations still rely on VNG for accurate time/frequency standards.

## ON THE SHORTWAVE SCENE

***Continuing on from my article*** in last issue, more news has come to hand regarding changes to our international broadcaster, Radio Australia. The Thai Government were pleased with RA's proposal to establish a relay station in their country to improve reception in China and surrounding regions and have requested further discussions between our respective government agencies. Singapore and Vietnam are also being considered if the Thai plan falls through, but, funding for any 'off-shore' facility must come from Australian government funds and this seems unlikely given the current economic conditions.

As tipped in last issue, RA will be relocated to the ABC's controversial new Melbourne headquarters to be built on the south bank of the Yarra River. They will share this building with the ABC Victorian radio network and the ABC Melbourne Orchestra. While not providing as much space as Burwood, this move will put RA near the centre of Melbourne and in addition to sharing facilities and resources it is hoped the move will improve communications between various sections of the ABC and RA.

## IRAN REPUBLIC FREQUENCIES

***The current schedule for*** Islamic Republic Of Iran Broadcasting (IRIB) has an English program to East Asia at 1130-1225 on 11790, 11715, 9705 and 9575. After the recent Iran earthquakes you should be able to hear what efforts are being made to rebuild this middle eastern country. To South Africa, and as extensively reported in the DX Press Radio South Africa has discontinued their international service and are now concentrating on HF broadcasts to the South African continent. Their latest English language sked is as follows: 1058-1255 on 17835, 11900, 11805 and 9555; 1358-1555 on 17835, 11925 and 9555; and at 1758-1855, on 17765 and 15270. The 9555 transmission uses a 100 kW omni-directional while all other transmission use 250 kW or greater aimed to local countries on the continent. And the latest from the BBC is that they are restructuring their foreign language schedule and should instigate many changes in April next year. Also on the cards is a planned move from Bush House, home of their main studios and office for many years, into a new high-tech centre. This is another example of the English Government's on-going commitment to bringing BBC into the 90s.

## U.S PRESIDENTIAL COMMUNICATION CHANNELS

***We all know that*** when the US President travels on diplomatic business he uses his personal aircraft, Air Force 1. The Vice President also has a specially outfitted plane, Air

Force 2. They both must have instant contact with officials back in the White House and while modern technology allows communications from aircraft directly to satellites the good old HF radio is still used. The VIP radio circuits for AF1 are part of the 'Mystic Star' network, a HF voice/data link to US Air Force bases throughout the world with remote transceivers controlled by telephone.

At least two voice frequencies and a secure teletype channel (called 'India Oscar') are continuously maintained and used for coordination of other communications links. The IO circuit is routed through 'Mystic Star' to the White House situation room and communications centre. Data transmission to and from AF1 is via a HF radio modem and is of course encrypted, however, circuit setup, tests and sometimes weather and propagation forecasts are often unscrambled, or 'in the clear'. Presidential traffic has been logged on 13204 between AF2 and Andrews Air Force Base. It might pay to add this channel to your 'need to know' frequencies and keep an ear open during the next overseas summits, arms talks and diplomatic missions. This info is courtesy of the computer BBS' International Shortwave Echo.

## PROJECT OMEGA ...AND YOU CAN HELP !

***Probably the largest*** radio communication project ever undertaken in Australia by hobbyists has been launched in Sydney. The Omega Radio Frequency Project is the brain-child of SWL and computer expert Rick Jones who plans to establish a PC database of all known and verified frequencies and make it available to HF DXers and scanner enthusiasts around Australia.

There are already some 147,000 pieces of raw data which need to be checked and verified before they will be included in the database. The database will allow information to be called up in several ways, complete with a full 112 field display of all known information on the service, from callsigns and codes to transmitter locations to great circle calculations and propagation data to determine the best path.

Once compiled, the Omega database will be available through computer bulletin boards around Australia. Users can also log onto these boards and provide corrections, updates and new services for inclusion into the database.

So where do you come in ?

Rick is looking for DXers who can assist with verifying the data. Each volunteer will be given a piece of the RF spectrum to check and once this is done those frequencies will be cross-checked by a second person. The result will be the most accurate and comprehensive monitoring guide ever produced, even more useful than AMFAR or SMIS !

If you wish to assist in this fine project, contact Rick on telephone (02) 634-3191 (AH) or drop him a netmail message at 3:713/605.

I think that if we can all get behind this very exciting project we will reap information which has in the past only been available to Government departments and corporations.

## CORRECTIONS AND OMISSIONS DEPARTMENT

***Last issue's column*** incorrectly referred to the callsign of the Queensland Police as being VK4RR...the correct call is of course VKR. A small error also appeared in the article on utility DXing concerning the name of a book recommended for HF listening. Although available from US communications specialists Gilfer Associates, the author is not Dave Gilfer himself and the correct title of the book is, 'Ferrell's Confidential Frequency List'.

No matter what you call it, it still should be on the shopping list of any utility enthusiast.

***And with that we end another chapter of HF LINK. If you have any notes that you would like to share with others then why not send them to me and I'll print them in my next column.***

***All mail should be sent to my new address of;***

***PO Box 108, Minto NSW 2566***

***or via the Shortwave Possum BBS on Fidonet 3:713/605.***

***Good DXing until next time.***


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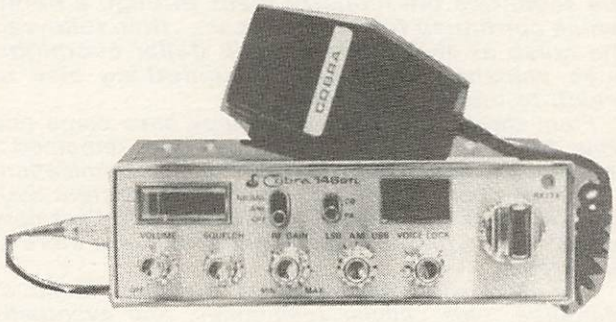

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# ONLINE

With PATRICK McDONALD

***What do you get when you cross a shortwave radio receiver with a computer? A really incredibly smart grey box that listens to stations all over the world, sends out reception reports, keeps all possible relevant data on file and leaves you with nothing to do but play golf ? Nope, that is definitely NOT what we are talking about here, boys and girls !***

Computers should exist to make our radio hobby more fun, more interesting, but, definitely ***NOT*** to take over and push us out of the picture. And that's exactly the sort of thing that yours truly will try to help you out with in this regular CBA column. Ever listen much to the amateur (ham) or utility bands? If so, you've heard a lot of morse code dit-dahing across certain frequencies. And if you're like me, you secretly wish you could learn to send and receive CW (as it's called) yourself ... maybe even earn your own amateur radio licence. Unfortunately, learning morse code, the gateway to that secret world of coded signals (and a requirement for the beginner's or novice licence), is a big mental stumbling block for many a radio buff, but, never fear!

Code need not be an obstacle any more: enter SuperMorse!

Yep, you guessed it — this is a full-featured shareware program for MS-DOS (IBM compatible) computers that makes learning morse code and upgrading your sending and receiving skills, a real snap. US author M. Lee Murrah WD5CID is no newcomer to his task either, having crested a variety of earlier, simpler CW training programs over the past several years. New improved SuperMorse, which only recently arrived on our shores via electronic Fidonet mail, is now slicker and easier than anything I have seen in the way of CW trainers and really 'commercial' in its quality.

## SUPERMORSE — COMPUTER CW

It starts with a full-colour menu screen asking what you want to do. How's about starting with the real morse code basics? Okey doke, SuperMorse teaches you to hear the difference between 'dits' and 'dahs' using your computer's speaker and even gives you a little test and grades you at the end.

Not bad! There are other menu options, too. How about learning the simpler letters of morse? No worries, as SuperMorse steps you through them one by one and then administers another little test. So it goes. You can request more complex groups of randomly generated letters and numbers, vary their speed and ***even simulate atmospheric noise!***

SuperMorse eases you through the learning process so smoothly and so enjoyably that before you realize it, you can actually recognize morse code and send it too, at around 5 words per minute!

SuperMorse then goes on to help you gradually increase your speed until you have a CW 'fist' of which to be proud. SuperMorse has too many features to outline here and moreover is very easily configured for your specific needs. If your dream is the novice amateur radio licence so you can enter the world of 'ham' radio, or if you simply want to be more cluey as to what is being secretly bandied around the bands in code ... grab this program from your friendly neighbourhood computer bulletin board (BBS), about which more later!

## TXL — CALCULATES ANTENNA MEASUREMENTS

Another computer program of interest to those of you who already have an amateur licence is TXL, distributed by the Gladesville Amateur Radio Club in Sydney and designed to help radio hobbyists calculate the parameters of a radio transmitting antenna without complex measurements.

In a nutshell, TXL allows input of four relevant parameters and then produces the info you need to design an antenna to meet your needs. This kind of calculation is a bit too technical for quick summary in this column, but, you hams know what I am talking about. And TXL is only one of many similar programs that allow your MS-DOS computer to do precisely and error-free, in one second flat, those computations that otherwise would have you and me ploughing through a forest of paper all day long ... and still coming up with the wrong figures!

## GETTING ONLINE WITH COMMUNICATIONS SOFTWARE

OK, let's leave ham radio for a while and look at something a number of CBA readers have asked me since the first ONLINE column appeared in these hallowed pages.

How, you ask, can I get my computer to talk to one of these modem thingies? They seem to speak two different languages! Well, this is pretty easy really and I would like to recommend another super-duper MS-DOS program for you.

# NEW SHOP FOR ANDREWS COMMUNICATIONS

***When Citizens Band radio was legalised in the seventies the industry went through a boom which continued for several years...then followed the crash as the 'make a quick dollar overnight' boys vanished in search of something else in which to make a fast buck.***

*From those early days, CB shops have come and gone, however, a number of names have remained a constant and one of them is Andrews Communication.*

*This company opened its doors in the eastern Sydney suburb of Maroubra 14 years ago and East now meets West with the establishment of a new store at Greystanes.*

*The new shop will carry all the gear found at Maroubra, plus cellular telephones, and eventually commercial two-way equipment. This is a new field for owner Lee Andrews who sees, 'a real need for this type of shop in the area.'*

*With six hundred square feet of floor space the new shop is twice the size of the long established Maroubra store.*

*Lee predicts that the three shops, two in Sydney and one in Melbourne, are only the begining of an Australia wide network. Further shops are planned for Brisbane and Perth, however, for the time being all efforts are being concentrated on getting the Greystanes outlet up and running smoothly.*

*If you are in the area drop into shop 8, 41 Bathurst Street, Greystanes, or telephone 636 9060 or 688 4301 and say G'day to Tony, the manager of the new premises.*

It's Telix and it is a member of that species called 'communications software'. Easily installed on your system, typing TELIX at the prompt brings up a request for the relevant parameters, which are usually 8N1 if you are using normal computer bulletin boards. If you have any doubts or questions in this regard, Telix comes with extensive documentation that you can print out and study, but, really, these docs are hardly needed and before you know it, you are at the menu screen and ready to enter the names and phone numbers of all your favourite computer BBSs ... like Shortwave Possums!

Once fired up, a single keystroke dials the BBS, connects your computer automatically and leaves you ready to download files, read messages and so on. You can even ask Telix to remember all your passwords and enter the appropriate one for each BBS you dial! Now that's real automation, folks ...

Further, while online, Telix makes your BBS operations easier than ever. A full range of file down-loading protocols are available, including the highly recommended 'Zmodem', with its fabulous abort-recovery (in case Telecom makes your phone line disappear in the middle of a file transfer), large-capacity screen buffering to allow you to go back and read what just scrolled by, full screen capture of course and the ability to drop down into DOS while online, in order to perform other functions on your computer.

## IN COLOR EVEN YET !

You can also configure the program in your favourite colors and set it to automatically perform all manner of online operations. Yes, Telix in its present version 3.12 is really state-of-the-art when it comes to comms programs. I promise you, you won't be disappointed!

So where do you get this fantastic stuff anyway? Here comes the final plug! Your first stop should be Sydney's Shortwave Possums BBS, online 24 hours on (02) 651-3055 at all baud rates up to 2400. Registration is free and you are welcome to roam around and check out the above programs and hundreds more and download what you like, spending up to 60 minutes online per day.

As well, because SWP is devoted to radio in all its forms, you can read messages from like-minded souls around the world, leave messages with your questions, tips, news and gossip for SWLs, scanner nuts, hams, CBers and computer users.

If you live outside Sydney and SWP is an STD call for you, you can almost certainly dial up a nearby BBS costing only a local call (unless you live in the middle of the Simpson Desert) which might well be persuaded to carry the world-wide shortwave electronic mail ('echomail') conference, which is available to all Fidonet boards. Ask the system operator (sysop) of your local BBS if, pretty please, will he hook it up for you.

You will need some sort of comms program to start with, natch, in order to find and download the above-mentioned shareware, but, commercial integrated programs with simple communications modules are usually supplied with all new computers purchased these days.

Modems often come with their own comms software, too. One of these beasties should suffice to get you connected to a suitable BBS in your locale where you can then download something much better, such as the above-mentioned Telix comms, but, please remember, dear radio nutters, 'shareware' means that you can try the program out before you buy, to see whether it's really what you want — but, it's not free! Do the right thing and send the dedicated, half-starved shareware author his small fee if you do decide to keep using the program regularly; you'll be supporting both the computer and radio hobbies and will go to sleep each night feeling a warm rosy glow!

***Gee, you know, I wanted to tell you about yet another program that's really interesting, but, that big CBA page number is looming just inches away now and I gotta wind down the word processor now or I'll overshoot and end up in the middle of an advertisement or something! So my review of Sydney-based software author Geoff Stanley's computer control program for the AR3000 scanning receiver will have to wait 'til the next issue! In the meantime, drop by SWP BBS if you get the chance, download some programs and talk radio with us shortwave buffs. BFN (bye for now) and 73s!***


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## Things you need to know about

# SHORTWAVE ANTENNAS

***Log those DX broadcasters and tune into those far-away utilities — Rob Williams has the 'good oil' on ripper SW aerials !***

**Okay, you've bought your new shortwave radio. But, did you think about what type of antenna you should use ?**

**Did I hear you say 'no' ?**

**Well, you can't get the best out of your receiver without the proper aerial and the right antenna will make a very big difference to your listening pleasure.**

Antennae come in all shapes and sizes, far too many to cover in one article, but, you can't start thinking about which type will best suit your QTH. In choosing an antenna you'll find that no matter which you decide upon there will be a compromise between size and performance. No single antenna will do everything, but, let's see what we can do to get as much as possible from that length of wire.

### ANTENNA THEORY WITHOUT TEARS

Let's not get too technical...an aerial/antenna is only a device which intercepts a range of signals or band of frequencies flowing freely through the atmosphere and its only job is to transfer as much signal as possible to your radio.

There are four important factors to consider when choosing your antenna. **Directivity** is the way the antenna receives signals from one direction rather than another. A Yagi or beam antenna is very directional, for instance, whereas your normal AM/FM car radio antenna is 'omni-directional', picking up signals from all around. Then there is **gain,** the measure of how much signal is received — more gain, more signal. Gain is usually measured in relation to a half-wave dipole antenna, so there is a standard against which you can compare each aerial. The range of frequencies the antenna is capable of picking up is the **'bandwidth'** and there will also be a **'resonating frequency'** which indicates the frequency at which the antenna will best perform and receive the maximum signal.

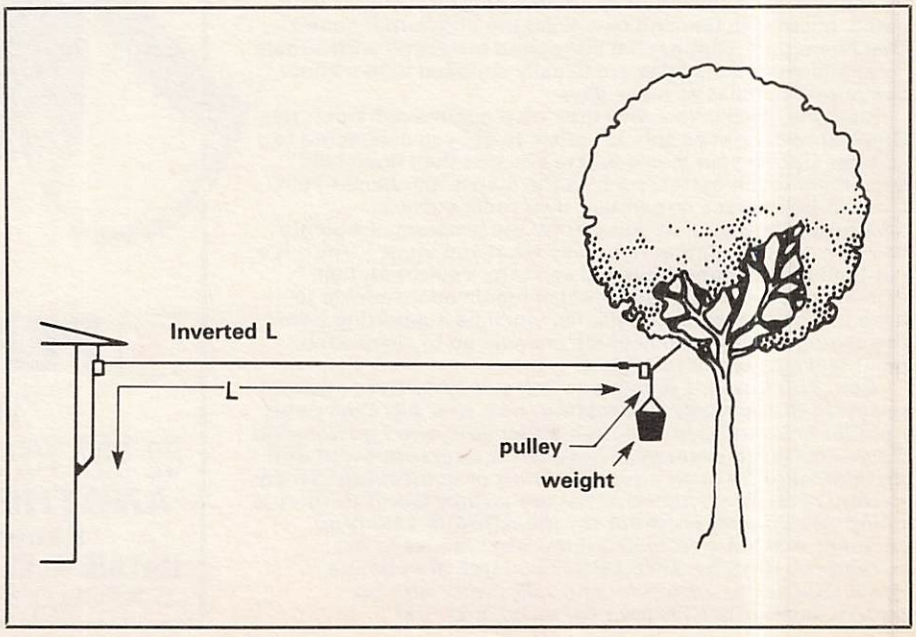
You'll also hear of an antenna being 'balanced' or 'unbalanced'. A balanced aerial has two 'electrically balanced' wires feeding into the radio and these antennae are generally referred to as 'dipoles'. They use coax or wire which has a nominal impedance of between 50 and 75 ohms. Unbalanced antennae' use single wires (often without shielding) and are much higher in impedance — one well-known unbalanced aerial is the longwire.

Either type of aerial should be located as high as possible and well away from any sources of electrical interference. Now all this is fine if you own a farm and have plenty of room to put up a dozen antennae, one for each band you want to listen to, but, most of us live on small suburban blocks where space is at a premium, so we have to make do with one or two antennas to suit all our needs.

### INDOORS OR OUT

It sounds pretty obvious, but, antennae can be located either indoors or outdoors. Indoors can include inside the roof of your house, which can be easily done provided that the antenna is kept away from electrical cables and any metallic material in the roof. There's a lot to be said in favour of indoor aerials.

They don't clutter up your backyard



and you don't have to panic every time a strong electrical storm blows up out of the blue, threatening to use your antenna wire as an electrical path to ground (via your new Yaesu, Icom or Kenwood). I have two long wire antennae in the roof and these allow me to carry on listening while storms rage outside. Also, they are hidden from prying eyes and neighbors who either think you work for ASIO or blame you for all those weird fuzzy lines that regularly appear on their TV set.

However, your roof and house may not face in the same direction as you want your antenna to run and if the roof is metal then it will keep much of the signals from reaching your radio, but, don't write off the idea of an in-roof antenna, because until you try it you won't know just how well it might work for you.

## LET'S LOOK AT OPTIONS

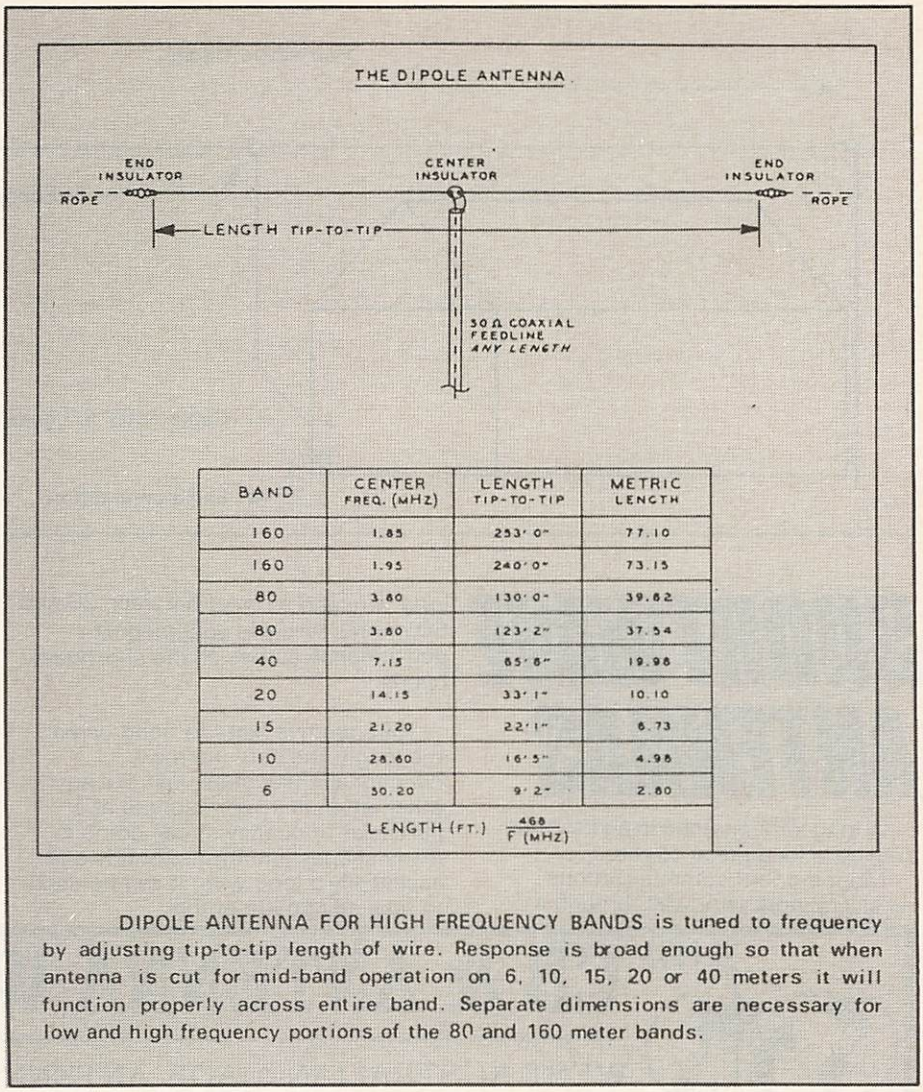
If you're unable to install an antenna in the roof (maybe you live in a flat) there are still several options.

You may be able to run a short length of insulated wire along the curtain rail or around the room. Again, keep the antenna high and away from metal objects and electrical equipment. TV sets are renowned for killing shortwave signals. When I built my house I had all the TV sets and plugs located as far away from the radio shack as possible and even so I still lose those low frequency Latin stations as soon as the TV is turned on. Another source of interference are home computers. One industry buzzword is EMC, or 'electromagnetic compatibility'. It's more like 'incompatibility' as the generated electromagnetic noise from computers, fluorescent lights and electrical power lines can often virtually 'wipe-out' received signals. You can improve the situation by keeping known noise-generators well away from your radio equipment.

Over the years I've heard stories of people who have constructed indoor aerials from a series of wires on the floor or under the carpet, dangled them out of high-rise buildings, even run them up or along flagpoles. This gives you just a few ideas as to how you can overcome the restrictions of living in a flat. Do keep in mind that the Body Corporate may not like your idea of running a few hundred metres of wire around the units or along the fence.

You'll find that as soon as you mention 'aerial or antenna', many people suddenly get weird ideas of what your antenna will look like and the environmental danger it will cause to the rare spotted owl that flies past your window once a year.

Of course your choice of shortwave radio will have something to do with all this. Small portable receivers may not have the facility to connect an external antenna. You can overcome this by retracting the telescopic antenna and just twisting a length of wire around its tip. The longer the wire the better, but, before you rush out and connect the rotary clothesline to your SW rig (and it's been done believe me) remember that many of the latest rigs on the market are very sensitive and may overload if fed with too much signal...so don't overdo it, just make sure you choose the right antenna for the job.




| BAND | CENTER FREQ. (MHz) | LENGTH TIP-TO-TIP | METRIC LENGTH |
|---|---|---|---|
| 160 | 1.85 | 253' 0" | 77.10 |
| 160 | 1.95 | 240' 0" | 73.15 |
| 80 | 3.60 | 130' 0" | 39.62 |
| 80 | 3.80 | 123' 2" | 37.54 |
| 40 | 7.15 | 65' 6" | 19.98 |
| 20 | 14.15 | 33' 1" | 10.10 |
| 15 | 21.20 | 22' 1" | 6.73 |
| 10 | 28.60 | 16' 5" | 4.98 |
| 6 | 50.20 | 9' 2" | 2.80 |
| LENGTH (FT.) $\frac{468}{F\ (MHz)}$ | | | |

DIPOLE ANTENNA FOR HIGH FREQUENCY BANDS is tuned to frequency by adjusting tip-to-tip length of wire. Response is broad enough so that when antenna is cut for mid-band operation on 6, 10, 15, 20 or 40 meters it will function properly across entire band. Separate dimensions are necessary for low and high frequency portions of the 80 and 160 meter bands.

## OUTDOOR DXING

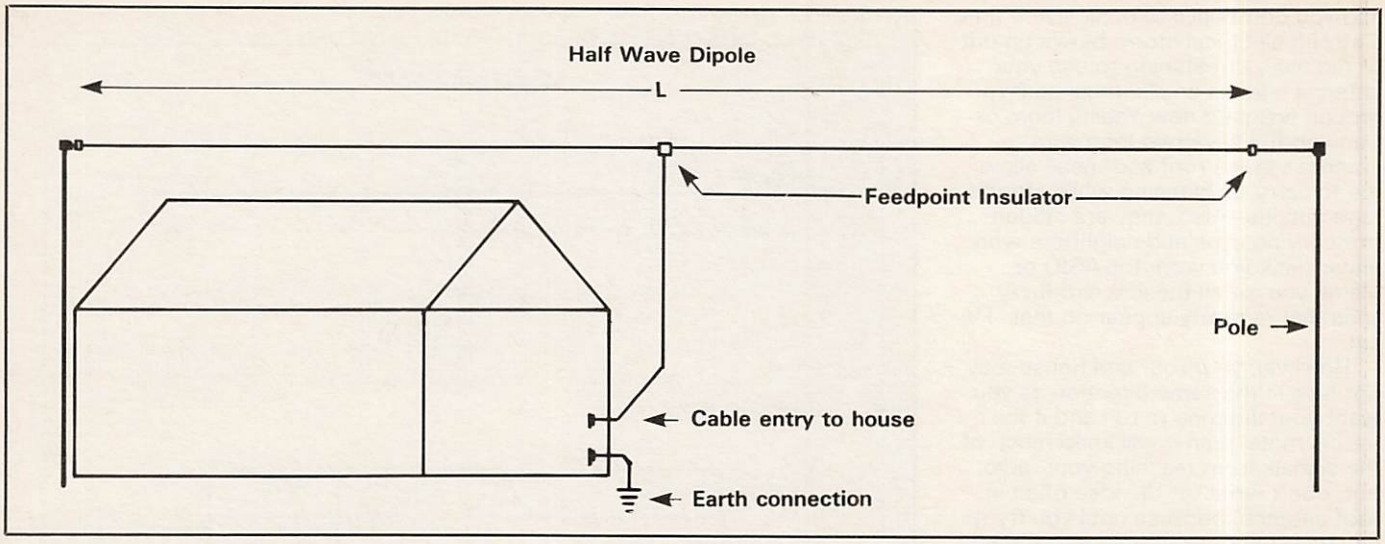
We have a number of factors to consider if we are putting up an outside antenna. Still try to get that wire as high as you can and always remember to disconnect your radio during any electrical storm. Even though your antenna may not be struck by lightning, a high build-up of static electricity often occurs during such storms and this can find its way through the antenna into your radio. Modern rigs have very sensitive front ends and a large static charge can cause serious damage.

Some of the most common types of antennae used by SWLs are dipoles and long wires. Dipoles are cut in proportion to the wavelength of a particular shortwave band or frequency. A full-wave dipole for the 60 metre broadcast band would be 60 metres long. If this is too long for your backyard, you could try a half-wave dipole which would be 30 metres...smaller, but also providing lower gain.

Reception can be further improved by a good ground connection for your antenna. The safest and most effective method is to drive a metal stake into the ground and run a wire to the earth point of your radio.

Do not — repeat do not — use the same earth connection as your household mains as this could destroy your equipment if any stray electrical currents flow through the circuit.

**(continued over)**




# SHORTWAVE ANTENNAS

A long wire antenna is as its name implies, a long piece of wire.

Most modern communications receivers work very well through a long wire and a run of between 20 and 60 metres will give you adequate performance across all the shortwave bands.

Here are five hints for long wires ... the longer the wire the more directional it becomes; just like any other antenna it will resonate at a particular frequency; it can come in many shapes and forms, but, is still essentially a long wire; it can be used to take advantage of the characteristics of the signal as it is reflected from the ionosphere; and the end of the wire, not its entire length, is the focal point for reception.

### MAKING IT ON THE MEDIUM-WAVES

**Medium-wave** DXing is a very different game to **shortwave** DXing.

Unless you have enough room to erect a resonant antenna several hundreds of metres long, you will have to use other more sophisticated aerials

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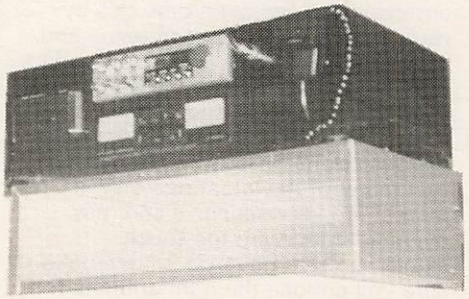

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which rely on tuned circuits and preamps. For MW stations within a range of approximately 200 km your trusty shortwave antenna will be fine. However, if you're after serious DXing on this band then I suggest you spend some more time building or buying a specialised aerial system.

The confirmed MW DXers go hunting for those interstate and overseas stations when the path between your QTH and the stations' is in total darkness. This varies throughout the seasons of the year, so you will need to understand day- night paths. The easiest way to understand what I am saying is (watch my lips) to get a globe of the earth and shine a torch on it. You'll see that as the earth rotates parts of the globe are always in total darkness while other parts are always in light.

So you can see that to have any chance of hearing Californian MW stations you need to have a darkness path from the West coast of America to your location. What doesn't help is the fact that most Australian MW stations broadcast a full 24 hours, which doesn't give you much of a shot at hearing those distant exotic signals because they are 'underneath' the local station.

This is where loops and 'Beverage' antennas are handy.

I've had the opportunity to set up several Beverage long wire antennas tuned to the MW band and have heard stations from as far away as the Caribbean and USA. Using a loop antenna I've QSL'd many US West Coast stations as easily as if they were locals. If you want to explore this fascinating field in more depth then consider joining a radio club that caters for MW DXers, such as DX Australia. This group provides an excellent coverage of MW events within Australia and around the world.

Local MW stations are generally received by the 'ground wave' component of their signal, but, this only survives for around 50 km. After that you need to rely on the 'skywave' component. Daytime reception of MW signals is very limited because the skywave must pass through the D layer of the ionosphere, which absorbs most of its strength. At night the D layer fades away and MW signals can be reflected from the F layers, travelling thousands of kilometres back to earth.

Whether you're after some DX challenges or just a better signal on one of the big gun international broadcasters, the right antenna is vital to your success — and when something as simple and inexpensive as a long wire can bring them in, there's no excuse for not getting the best from your receiver.

# Do-It-Yourself Dx!

**Shortwave aerials aren't very hard to build, you can use the same basic designs for many amateur antennas such as long-wires, dipoles, inverted-V's and so on. There are also some very good kits on the market, two of which are from Dick Smith Electronics and Technokit. Rob Williams put them through their paces.**

**Dick Smith Shortwave Antenna Kit**

Everything you require to build a competent long-wire aerial is included in this kit from DSE. The antenna itself is made up of 20 metres of plastic coated copper wire, which connects to the lead-in to your shack through a T- shaped clamp. Also supplied are two egg insulators and around 10 metres of plastic rope to isolate the antenna from the support poles.

It isn't necessary to do any soldering to put the antenna together, although DSE do suggest that this be done as it will strengthen the connections. It is also worthwhile covering the T-clamp with a waterproof silicon sealer such as Silastic.

I had no trouble putting everything together and the instructions are so precise that even the most non-technically minded SWL could get it up in a few hours. I strongly suggest that you purchase two extra egg insulators to rig up a pulley so you can lower the antenna to the ground to carry out any repairs that are needed.

I installed the aerial in an east-west orientation using two metal poles which support my existing SW antenna. You may want to suspend the long-wire between two trees, but, remember to leave some slack in the antenna to allow the trees to sway — otherwise you're going to wake up one morning and find two pieces of wire on the ground where the antenna once was.

If the lead-in is fed through the roof, as it is in my house, always be careful not to let it rub against the roof's metal flashing. Keep the lead-in as short as possible, because the longer it is the more noise and less signal will get through to your receiver.

The antenna can be made to cover the entire shortwave spectrum and works very well indeed. It is a very simple design, sturdy enough to withstand the elements and once it's up there should be little maintenance needed. And having everything supplied in the one package is certainly much easier than running around looking for each part on its own. With a bit of antenna theory you could easily use this kit together with a length of coax to construct some other useful HF aerials.

**DSE have done their homework and provided a good kit for an affordable $29.95. Thanks to DSE radio buyer Chris Ayres and their Campbelltown store for supplying this aerial.**

**The MW Techniloop**

Loop antennae use a few basic electronic principles to overcome the traditional problem of aerial length. It's basically a loop of wire forming a flat coil, inside which you place your MW receiver. The coil uses induction to capture signals and feed these into the radio's existing antenna (in some cases no more than a ferrite bar) without any electrical connection between the two. Because it doesn't need batteries or any power source at all, this design is termed a 'passive loop' and that's what the new 'Techniloop PX1' is — a small antenna with big performance.

The PX1 is sold both as a kit for $44, or completely assembled and tested for $69. The circuit for the radio is very straightforward and uses only a few components, which makes it easy to assemble even for those who have had little experience with electronic circuits. Yet the Techniloop makes a world of difference to mediumwave listening and DXing. The radio comes alive with more signals than you've heard before. Most modern radios have poorly designed front ends, because the manufacturers assume you are only going to listen to local high-powered broadcasters.

This is where the Techniloop comes in. Without any effort I was able to listen to 2ZB in Wellington, NZ on 1062 kHz and even though some Australian stations also use this frequency I was able to reduce their signal level or 'null' them out by rotating the radio and/or the loop to find the best position for 2ZB.

If you want an inexpensive way to DX on the broadcast bands, this is the antenna you need.

**The Techniloop PX1 is available from Jiloa Pty Ltd, PO Box 73 Glenhuntly Victoria 3163, phone (03) 571 6303. They have kindly donated one of their kits to give away to a HF LINK column reader (the address is at the end of that column) and all you have to do to win is write to me with details of your latest MW loggings — the best letter gets the PX1.**

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# BAND SPREAD

FROM DC TO DAYLIGHT

WITH GREG TOWELLS

***Welcome back to Bandspread, hope that you're working plenty of DX and generally having fun...I have several diverse topics for this issue so read on...***

## WHERE and HOW TO OBTAIN WEATHER FAX

Knowing that lots of readers run multi digital mode type decoders, once playing around with packet, RTTY, morse and AMTOR gets a little on the dull side or all the RTTY stations that you can receive seem to be operating all sorts of strange shifts, what else can you do with it?

Well, provided that your machine can handle fax transmissions and you have a printer, here are a few frequencies that you might like to park your all mode miracle on.

Weather fax, containing weather maps, wave diagrams and numerous other details, can be found on the following frequencies:

**From Melbourne on 2628, 5100, 11030, 13920 and 20469 KHz.**

**From Darwin on 5755, 7535, 10555, 15615, and 18060 KHz**

A schedule is broadcast every day at the following times:

**On all Melbourne stations from 0115 to 0130 UTC and on all Darwin stations from 0030 to 0045 UTC.**

A chart of recommended frequencies for reception of Melbourne (AXM) and Darwin (AXI) as calculated by the IPS is broadcast every day at the following time:

**AXM - 0130 to 0200 UTC**
**AXI - 0000 to 0030 UTC**

Also available from the Bureau of Meteorology is a free booklet (and while its **FREE**, grab one!) which tells you what all those little strange marks on the charts mean and gives descriptions of what different charts mean, so that we can all become expert weathermen and astound our friends and neighbours with astonishingly up to date and accurate forecasts, just like the guys on television !

**The address to write to is:**
**Director of Meteorology**
**Attention: SRCM**
**GPO Box 1289K**
**MELBOURNE VIC 3001 or**
**Regional Director**
**Bureau of Meteorology**
**P.O. Box 735**
**DARWIN NT 0801**

**So go for it, all you potential TV weather experts.**

Maybe my eyes are going or the brain is wearing out, but, after reading the article on Sydney's Monorail system (and two-way system), I thought there was something missing. Granted, the background on the Monorail was very informative and the details and codes used on the radio setup may have been very useful, just one detail was missing !

**WHAT FREQUENCY DO THEY USE ??????**

I certainly could not see it. Of course, it makes sure that everyone scans the magazine thoroughly to see if they are on another page. Maybe next time ?

Hey, come on Greg, would we do that to our readers ? To obtain all the background material on the monorail we agreed not to publish the frequencies with the story, however, if you have a look at Scanning Action in the March/April issue of CBA you might just happen to see them...and in case you do not have that issue on hand they are; voice 485.250, data 485.550, 486.400 and 489.375 (Editor.)

## WHAT'S HAPPENING TO 27MHz SIDEBAND

Is it that the bird-brains on 35 LSB have finally started to shift the DXers off the channel permanently, or does everyone want to make calling channels out of **EVERY** channel. Why that burst, you ask. Well it seems that, in Sydney at least, the latest DX call channel (on the legal channels anyhow) is fast becoming channel 39, mainly USB. On a regular basis, there can be found a large and regular net of stations with long callsigns who spend most of their waking hours chatting and chasing DX on 39.

It seems to be catching on fast around here and thankfully the lunatic fringe stays put on 35 LSB, arguing about the non-status of 35 as a call channel for hours on end. All this while 39 is the domain of reasonably sane, quiet DXers doing their thing.

Have a listen one day, you may be surprised and just maybe you won't have to expand your radio upstairs or downstairs for a good conversation or DX contact. Now after this publicity, they will probably want to do damage to me !

## 'ROLL YOUR OWN' ANTENNAS

I have been into the 'roll your own' antenna business lately, particularly for 27Mhz (and the HF Amateur bands). Lack of money, manpower and space are good excuses for engaging in this pleasurable aspect of radio experimentation. It is surprising the results that can be achieved with a few pieces of wire hung around the property and terminated into a decent antenna tuner.

A good reason for wire antennas, particularly thin, hard to spot ones, is when they are erected soon after moving into a new residence. I have lived in a number of areas, surrounded by wonderful neighbours who suddenly find severe TVI, BCI and sundry other nasties happening to their electronics immediately upon the construction of your pride and joy base station aerial, whether or not it is connected to your radio.

This can develop into a frustrating business as many refuse to believe that the fault may just lie with their equipment. If you put up an 'invisible' antenna first and try some weeks or months of operating, then it is possible to check out the local radio scene without neighbourly harrassment. It is after a few weeks that you may be able to see a few nearby people and ask quietly whether they are receiving any new interference. If there is any interference happening, then you will be prepared for it.

However, after then putting up your new skyhook and receiving complaints, you are then in a position to know whether it is you, or what can be done. At the very worst, the big visible skyhook can come back down and all operating can be done on the 'invisible' antenna. What they can't see generally ceases to affect them.

Dipoles are good, easy to construct and give good results. Little theory or background knowledge is required to build one and make many contacts. However, there are a few little hints about them that will enable you to obtain even better range and less interference from your creation.

## BALANCED or UNBALANCED ?

Since a dipole is a balanced radiator (that is, the two lengths of wire from the centre of the antenna are supposed to be the same length), it figures that the antenna will radiate more of the power delivered to it if fed by a balanced feeder. Unfortunately, the coax cable that is the most common type of feeder used is an example of an unbalanced line. Also, a balanced aerial fed with unbalanced line will only work efficiently on the band it is cut for and will have a limited bandwidth. How to fix.....

The answer is to still use your unbalanced coax cable, but connect it to your dipole via a **BALUN.** A balun converts your unbalanced 50 ohm feedline to a **BALANCED** 50 ohm feed for your antenna. It also makes a rather solid support for the centre of your antenna. The end result is more power radiated by your antenna, not by your feedline, less television interference and the satisfaction of making something that works as well as a store bought item.

Next issue I will run through some of the more common commercially available baluns, and their faults, so get your wire, insulators and home-brewing spirit going. **Thats all for now and remember, I need letters to know what's going on in your area. The address is P.O. Box 514, Toukley, NSW, 2263.**

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|---|---|
| Frequency Coverage | 8-600MHz/805-1300MHz |
| Sensitivity | N.FM 0.45uV @ 12dB SINAD<br>W.FM 1.0uV @ 12dB SINAD<br>AM 1.0uV @ 10dB S/N |
| Scanning Speed | Minimum 20 channels/second |
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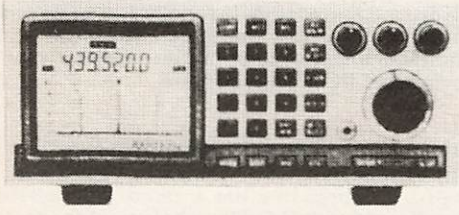

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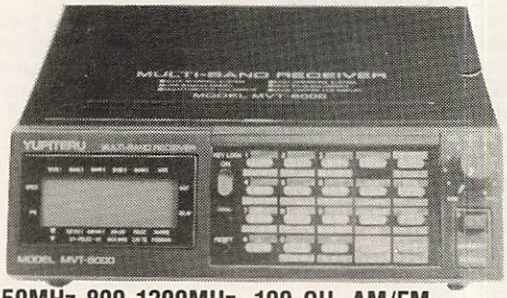

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Freq control: Digital PLL synthesi ser
Type of emission: 16F3
Antenna Impedance 50 ohms
Power supply: 8.4V - 15%
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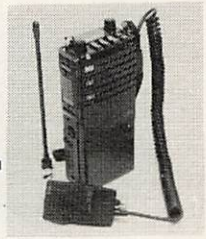

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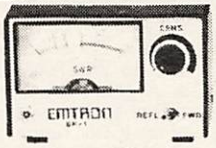

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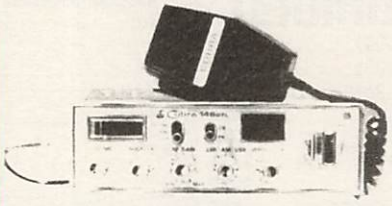

For this month our special deal is the Cobra 146GTL as reviewed in this issue. Just ask our price which will get you talking on a great SSB rig.

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PART THREE

# SPECIFICATIONS What do they mean?

***By Ken Reynolds***

## (Powerband Communications)

**Over the past two issues we have discussed General rig specifications and Transmitter Specifications in fairly basic terms. This time we look at some of the Gobbledygook associated with CB radio receivers for both 27MHz and UHF.**

Since last issue I have received quite a bit of feedback over the difficulty some readers experienced in understanding parts of the discussion. At the other end of the scale, some readers thought I could have raised the tone to a more technical level. Fortunately for my ego, the bulk of the responses were favorable saying they thought the balance was about right.

The wide ranging comments so far received about this little series only serves to illustrate the diversity of readership of this magazine and the difficulty in tailoring the articles to suit the readership.

So far, I have attempted to keep the discussion at a level where plain language prevails to describe quite complex phenomena, however, in some instances the reader is required to have a basic understanding of physics — about school 'year 9'. To simplify these articles further would require a whole new series of articles taking us right back to the very basics of radio and electronics.

### RECEIVERS

**I hope you are ready for this because understanding the actual 'properties' of radio receivers is probably the most difficult part we have attempted up to date.**

All CB rigs use a receiving system known as Superheterodyne reception where tiny signal voltages appearing at the aerial terminals of the receiver are 'mixed' with a controlled, stable signal which is generated within the radio receiver itself.

When you hear two AM stations on the one channel the 'howl' or 'squeal' that comes from your speaker is a Heterodyne which is the small difference in frequency between the two signals. For example, on channel 20 '27MHz' CB both transmitted signals should be exactly 27.205MHz. But, as we all know, many rigs are a little off frequency (refer to the frequency stability specs) with the result that the **HETERODYNE** appears in the Audio Frequency spectrum and appears as that howling sound that makes it impossible to hear properly either station. If one station transmits exactly on frequency — 27.205MHz — and the other is slightly off frequency at — 27.203MHz — the resultant difference in frequency is 2kHz (kilohertz) which emanates from your speaker as a shrill tone or squeal — you choose the words.

If we take the Heterodyne principle of mixing two frequencies together to arrive at a resultant, different output frequency, you might be able to visualize the beginnings of the **SUPER** Heterodyne principles and how they can be made to work for us instead of against us.

Figure 1, illustrates what is known in radio and electronics as a Block Diagram. It is electronics equivalent to a road map illustrating the properties and signal flow paths around what might be a complex electronic circuit. Each stage of the circuit is resolved to represent one Block in the diagram to give a quite specific idea of events taking place and the order in which they occur. Computer buffs would more likely call it a flow chart which is probably more accurate in its description.

If you take your time and follow the explanations step-by-step, most readers should be able to grasp the principles by which the modern **Superheterodyne** receiver operates and why some of the peculiar effects noticed in practice can occur. After we discuss the circuit operation in terms of the Block Diagram it will be easier to understand the 'Specifications' and why we need to know about spurious responses and image rejection.

Each step of the explanation is titled by the **BLOCK** name. A number of blocks have been omitted to simplify the explanations. For example, the power supply which involves various voltage regulators and switching. We all know the receiver needs power, so I don't see the need to complicate the diagram unnecessarily. I have also omitted things like the PLL (Phase Locked Loop) which generates stepped frequencies allowing channel selection, and Noise Limiter and Noise Blanker blocks.

Between the diagram blocks I have inserted the resultant frequencies obtained from the receiver processing techniques employed. The receiver might be UHF or 27MHz CB, however, I have selected frequencies which best suit the simple understanding of the processes. In this case the received signal we are looking for is 100MHz which is somewhere in the VHF band between the two CB allocations. The Mixer frequencies used in the Block Diagram are also for simplicity of explanation rather than exact examples used in a real receiver.

### RF PREAMPLIFIER

In figure 1, signals pass from the antenna down the feedline and into the RF Preamplifier (Radio Frequency Preamplifier) which is used to amplify or increase the tiny signal voltages to a level where they can be further processed toward the recovered audio signal that finally emerges from the loud speaker of the receiver.

**(continued over)**

PART THREE

# SPECIFICATIONS
# What do they mean?

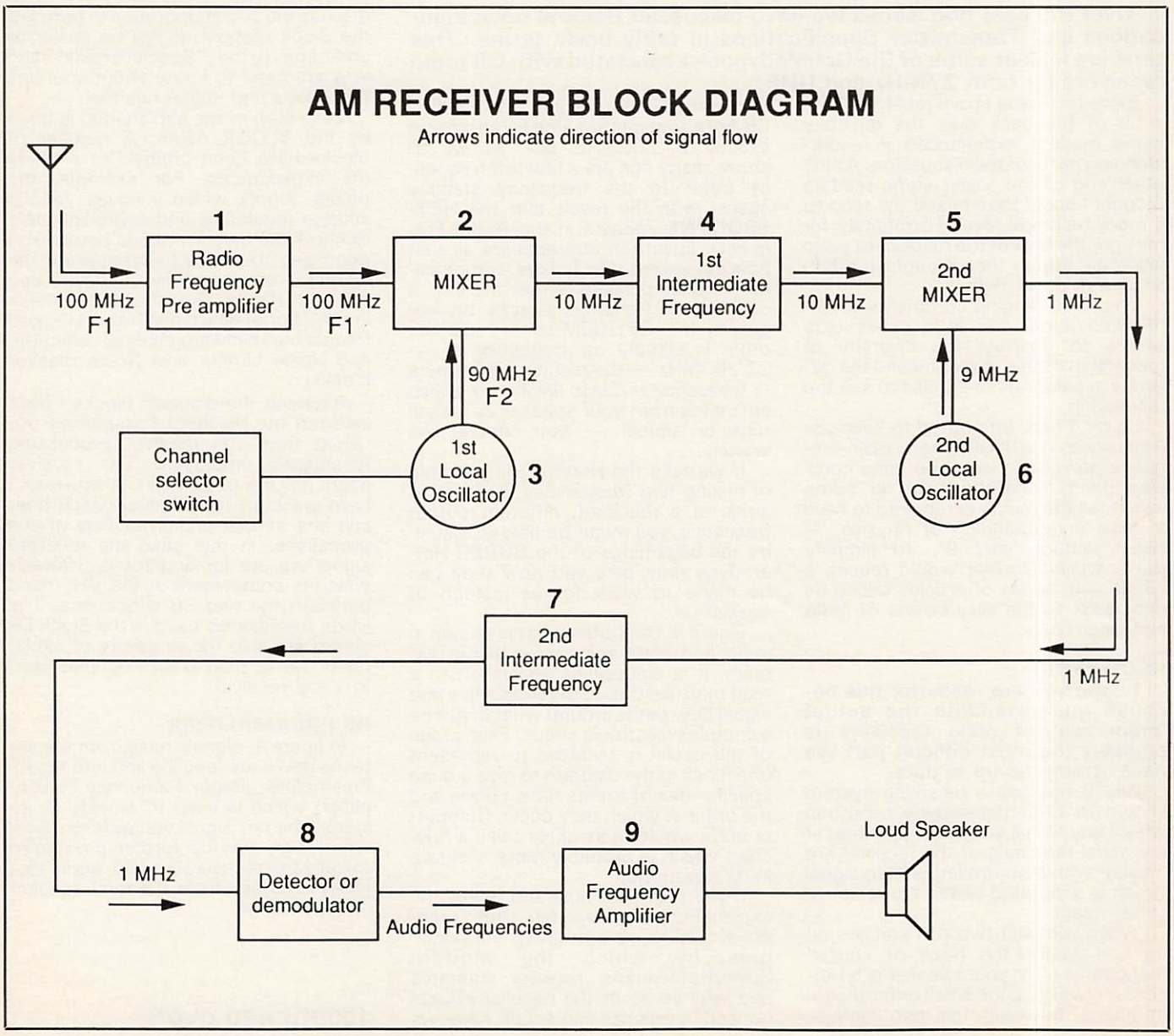
**(continued)**

Our sample receiver here has one RF preamplifier — some receivers have more and others use no RF preamplification at all. The preamplifier uses some 'selective' tuned circuits (a type of filtering) which allows the passage of a small range of desired signals while attempting to 'reject' unwanted 'out-of- band' signals from entering the system. In a 27MHz CB receiver we only want signals representing channels from 1 to 40 to enter into the receiver....some of us probably want more channels !

No matter how many channels over which we desire coverage, we want the absolute maximum signal strength possible from each and every channel to be received. But, we also would like to reject all other frequencies to the maximum degree to keep them right out of the receiver entirely. In terms of electronics and physics this is a pretty tall order and one which is virtually impossible to achieve. So, we admit to the receiver the best compromise of desirable and undesirable signals that the laws of physics and economics will allow.

This first stage of Amplification and Selectivity is very important when you understand that many thousands of tiny signals appear simultaneously in the antenna circuit and our goal is to separate out only one specific station at a time. The antenna signal voltage we are attempting to select out of the many might have a level of less than one millionth of one volt while there might be signals present which are hundreds of times more powerful. So, you can see that our poor receiver has really got its work cut out.

It is near impossible to do all the work in this first receiver stage so we must be satisfied to reject most of the undesired signals with the tuned circuits and then amplify the range of retained signal voltages to a level where they can be processed without causing any further deterioration in their quality. We are looking for the 100MHz station



and after processing in this stage the emerging group of signals will probably range in frequency from about 100MHz and 120MHz with the whole group having been considerably amplified in level.

## MIXER OR FIRST CONVERSION STAGE

**The Mixer or First Conversion stage (block 2 in Fig. 1) is the crux of the Superheterodyne radio receiving principle.**

We have already discussed the Superheterodyne basics above and in this Mixer or First Conversion stage of the receiver the principles are finally put to some practical use.

This block has three basic connections as you can see. The arrows show the direction of signal flow.

The signals from the antenna are amplified in the RF preamplifier and fed into the Mixer stage. You will also see that Block 3 — the First Local Oscillator — feeds its signal into the Mixer. For simplicity the channel switch is connected directly to the local oscillator and its purpose is to control the channel frequency steps — we will see why shortly.

As we already know, when two signals are 'mixed' together under specific circumstances, the result is the formation of new signals which have a simple mathematical relationship to each other — we get the two original signals and the new signals produced are the sum and the difference of the two original signals.

Let's call the received signal F1 and the Local Oscillator signal F2.

Our result is: F1, F2, F1+F2 and F1-F2.

**Substitute the frequencies and we get:**

**F1 = 100MHz**
**F2 = 90MHz**
**F1+F2 = 200MHz**
**F1-F2 = 10MHz**

In point of fact, there are many more resultant frequencies produced but we don't need to consider them in this discussion.

One of our main objectives in the 'Conversion' or 'Mixing' process is to convert the original high frequency to a lower frequency which is easier to process. For example the physics of lower frequencies allow us to manufacture quite narrow filters which can exclude all but a very narrow range of frequencies as we will see in the next Block.

Another advantage of the Mixing process is that we achieve a considerable amount of extra amplification or 'Gain' in our desired signal range.

Because of the component values chosen for the Mixer, the output from this stage is largely the 10MHz 'difference' frequency while F1, F2 and F1+F2 are heavily attenuated and discarded. Remember, however, that there is still a range of other near-by frequencies from the antenna that have been 'mixed- down' with the desired signal — these now have to be eliminated to the best of our ability so that we can get the original 100MHz signal clearly on its own.

## INTERMEDIATE FREQUENCY AMPLIFIER

The Mixer output is now fed to the First Intermediate Frequency Amplifier — usually known as the First I.F. stage. As its name implies this stage is largely a high gain (high performance) amplifier designed to raise the now 10MHz signal way above the noise level and other near-by frequencies.

The equally important function of the IF amplifier is to filter very selectively the range of frequencies entering and to eliminate all but the desired 10MHz converted signal. Through the use of carefully designed quartz crystal filters this accurate selection process can be achieved to extremely accurate tolerances. So, emerging from the First IF Amp. is a very narrow band of frequencies slightly above and below our 10MHz signal which we have now picked out from the thousands of other signals that we don't want to hear.

## SECOND MIXER CONVERSION

Many receivers employ a second stage of Frequency Conversion which further amplifies the desired signal bandwidth and even more selectively eliminates any remaining remnants of undesired sidebands and rubbish that may have crept through the previous stages.

## SECOND INTERMEDIATE FREQUENCY AMPLIFIER

Our sample receiver uses this second conversion and by injecting a 9MHz Second Local Oscillator signal to mix with the 10MHz received signal product, the output of this stage is now a quite low frequency of 1MHz which is passed onto the Second IF Amplifier for further filtering.

## DEMODULATOR — DETECTOR

The output of the 2nd IF Amp passes to the Demodulator or Detector where the remaining 1MHz RF (Radio Frequency) is separated from the AF (Audio Frequency) modulation that was impressed on the original 100MHz transmitted signal.

## AUDIO FREQUENCY AMPLIFIER

The last stage before the loudspeaker is an audio frequency power amplifier which raises the low power Demodulator output signal to a sufficiently high level to drive a standard loudspeaker. The result of course is a representation of the original audio signal reproduced possibly thousands of kilometers away from the originating station.

As you can see, the Superheterodyne reception process is a clever means of manipulating voltages and frequencies to amplify and separate out one specific signal from thousands of others in what might at first appear to be an impossible task.

Superheterodyne reception offers a great number of advantages over other forms of receiver style, but it also has a few disadvantages.

During the Mixing/Conversion process it is possible for other unwanted signals to slip into the works and 'mix' with our Local Oscillator and Wanted Signal to produce adverse effects. Also, very strong, Out-Of-Band signals appearing in the antenna can also act like an extra Local Oscillator within the RF preamplifier and first conversion stage to produce Phantom signals that can appear as recovered audio signal in the loudspeaker.

These Intermodulation and Image products may not really occur anywhere near the desired signal frequency but they come out the speaker just the same as the wanted signal.

UHF operators will probably identify with these effects more readily than 27MHz operators who generally don't have to contend with high power commercial and instrumentality base stations whose frequencies appear well within the bandwidth of their RF Preamplifier stages.

There are other types of receiver which don't suffer from many of the adverse effects of the Superheterodyne process but they are generally limited in their frequency of operation and they require great elaboration in their tuning processes. From all accounts, the process we have discussed here has the most to offer in terms of performance and economy. It is possible to manufacture a sophisticated Superheterodyne receiver which eliminates to a high degree the problems noted here, however, in the budget allowed for your CB rig it generally means that you will inherit a few **IMAGE** and **INTERMODULATION** problems.

If I have explained superheterodyne reception properly in this issue, we will be able to get together an understanding of most receiver specs in the November/December issue of CBA.

**If you think I missed some important points in this issue, write to me at Power Band Communications, 1289 Nepean Hwy, Cheltenham. 3192. and I will try to cover the exclusions in the next issue.**

## Ken Reynolds of PowerBand Electronics reviews the

# COBRA 148GTL

***Is this the best ever 27MHz rig, if not, why has it remained unchanged for so long...?***

**The Cobra 148GTL from the Dynascan Corporation in California has been an industry standard for many years and in all that time most of the original features and circuitry has remained unchanged — not because they couldn't be bothered, but because the rig is so good there was no need to change it.**

**The 148 is distributed in Australia by the HATADI Electronics Corp in Mona Vale, NSW.**

A longtime rumor on the grapevine has it that the Cobra 148GTL is really a UNIDEN GRANT in the same case but with a different fascia panel. The story is reasonably well founded in that UNIDEN is the manufacturer and the case is identical to the GRANT. Internally, however, the COBRA has some areas of significantly different circuitry although there are still some strong parallels to be drawn between these two deluxe transceivers.

The Cobra's operations panel is predominantly shiny 'chrome' plating with the only relief being the signal meter, control graduations and the decals. The large case is standard CB black with a heavy, zinc passivated mounting bracket that uses four, screw-driver slotted screws for attachment. The angle adjustment of the bracket is achieved by tightening one pair of the mounting screws which move through an arc shaped slot cut in the bracket.

### DYNAMIKE AND VOICELOCK

Dynascan Corp has always had a more Hollywood approach to labelling their rig controls than the other manufacturers and if you are looking for the microphone gain control you will find it is named **'DYNAMIKE'** and the old fashioned clarifier becomes a **'VOICELOCK'** control. Some will argue that these controls are significantly better than a clarifier and mike gain, but honestly, I can't find the difference.

Other fascia controls are par for the course being set out neatly in line with sufficient spacing to allow for easy manipulation by even comparatively thick, blunt fingers. There are two good reasons for the good control spacing — the control panel is much larger than average although it is difficult to get this perspective from a photograph — and the microphone socket is located around the corner on the left hand side of the case. The RF/S meter is a standard 'off-the-shelf', edge scale, moving coil meter of the type used in the CB industry for years.

For most operators the real meter is leaps ahead of the current tendency to use four LEDs in a poor resolution, bar-graph configuration. At night, however, it is often difficult to see the meter needle against the graduations on the brightly colored scale.

**Big, heavy and clumsy, but second to none in performance.**

### ROOM FOR THE TECHNICIAN'S FINGERS

Internally the 148GTL is pretty well packed with components and in some areas one might say the space is rather congested. This model has a moderate size wiring loom which is typical of rigs from the boom-time era that produced this design. The components are also noticeably larger than the current trend in transceivers, however, this fact in itself allows a bit more latitude for the service technician to access the main circuit board which is 'single- sided' (has printed wiring on one side only) and uses discrete wire straps to join together copper tracks on the underside. The soldering throughout the rig is good with all connections having the shiny appearance that generally indicates reliable joints.

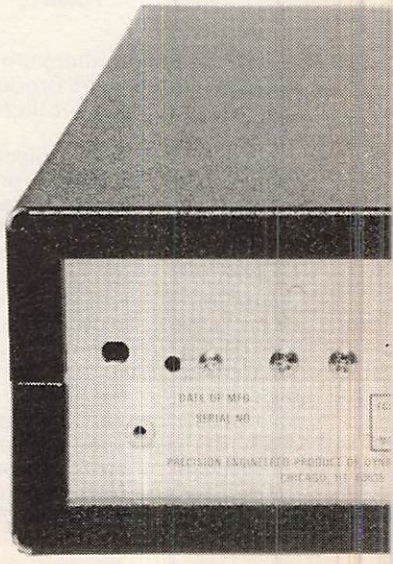
### EXCELLENT PERFORMANCE

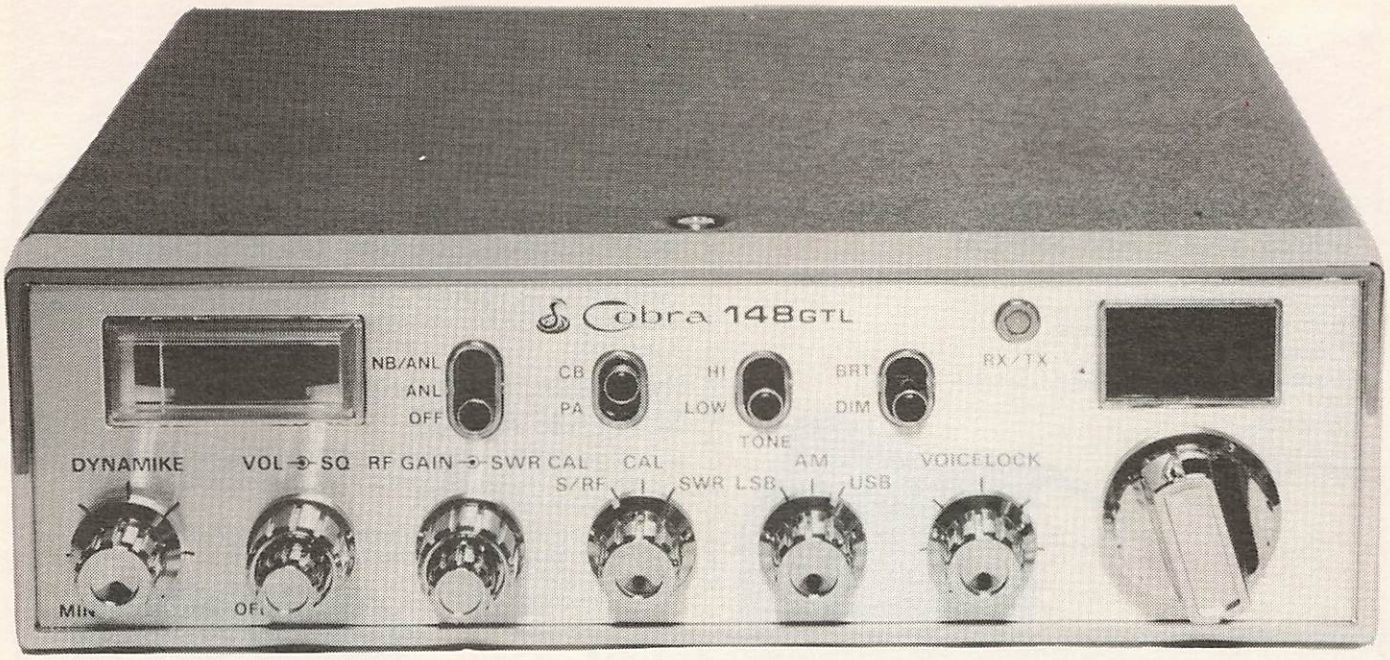
The transmitter is up to 'scratch' in all respects with an AM output power of 4.1 watts which suffered no degradation after our usual five minute continuous test transmission. Because of the rig's excellent stability, we ran it for 20 continuous minutes and found that the power output had slightly increased to 4.2 watts while the case temperature was still only warm. Both upper and lower sideband transmissions recorder the prescribed power output of 12 watts PEP and the frequency accuracy of all transmissions was excellent.

Transmitted audio was identical to the GRANT and just for kicks we swapped from one rig to the other in on-air testing and found that our little group of enthusiastic helpers could not pick the difference. However, when we 'snuck' in a couple of other rigs without warning, every listener in the group reported a significant change in quality on both AM and sideband.

### FULL MICROPHONE CONTROL

The Dynamike knob offers full control over the microphone level from zero modulation to the 100 per cent modulation limit and then some. The most comfortable level was about 'half-way' where the most natural results were obtained on AM transmissions. Higher levels tended to cause a little overmodulation before the heavily weighted ALC function






'snapped' the modulation level back down to about 90 per cent. On sideband, the Dynamike control allows the operator some means of control over the output power level by adjusting the drive level to the RF power amplifier stages.

Recovered audio from the Cobra 148 is smooth and easy on the ears compared with many of the cheaper rigs on the market. Again, it was interesting to draw a comparison between the two similar rigs but this time in conversation with each other over a range of some eight kilometers. There is no doubt in our minds that both rigs really shine when each is corresponding with a similarly higher grade station.

Receiver sensitivity on AM was quite good at about 0.22 microvolts for 12dB SINAD and on sideband the results were a touch higher at 0.32 microvolts. A slight loss of sensitivity and the introduction of some noticeable audio distortion was noticed when the Noise Limiter and or the Noise Blanker controls were operated. The noise limiting circuits were quite effective at reducing a wide range of interference sources but, as usual, there is not much that can be done about 'power line' noise.

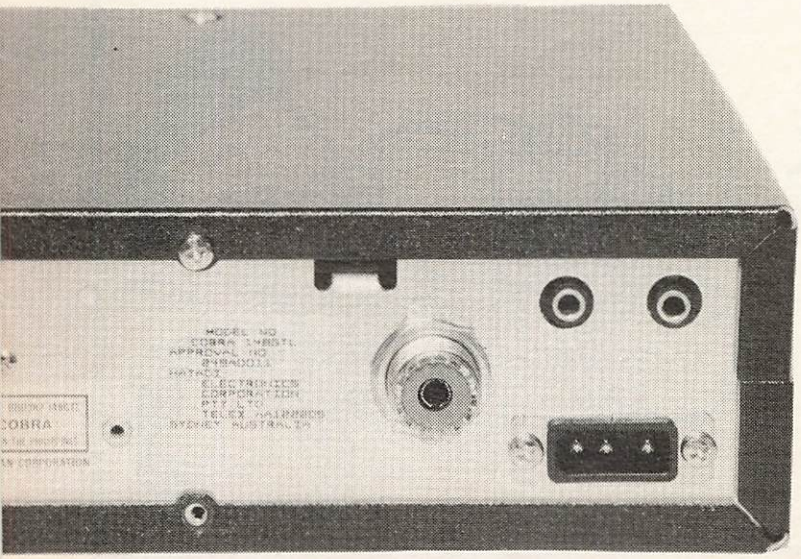
Squelch action on the Cobra is better than average with the 'threshold' occurring at 0.35 microvolts while at the maximum setting (tight) it required a signal of more than 1,000 microvolts to bring the speaker circuit to life. The control has just about the right amount of hysteresis for an AM/SSB transceiver.

The RF gain control has a range in excess of 30dB which is more than adequate for any given situation encountered in normal operation.

## HIGH/LOW PITCH CONTROL

The Cobra also has a tone control offering high or low pitch at the flick of a switch while an adjacent control allows the operator two levels of brightness for the channel display.

One useful feature the Cobra has over the GRANT is an incorporated SWR meter that we found to be adequate for most antenna tuning applications. While we would not consider this meter to turn-in 'technician standard' results it certainly allows the operator to tune an antenna for the best 'dip' and serves to keep a check on the antenna condition at any time without the addition of extra items of equipment dangling around the car or shack. The SWR function is activated through a three position switch that serves to change the meter from 'S'/RF power reading to calibrate for forward power and then to read SWR or reflected power. The Calibrate knob shares a dual concentric shaft with the SWR control.



## SUMMARY

**The Cobra 148GTL is big, heavy and clumsy by most modern standards but the way in which it does its job is second to none. If you have got the room in your 'transporter' for a five pound jumbo, it is well worth considering the King Cobra for mobile communications. As a base station the 148GTL makes good sense and takes up less space than the AM/SSB desk top rigs presently available.**

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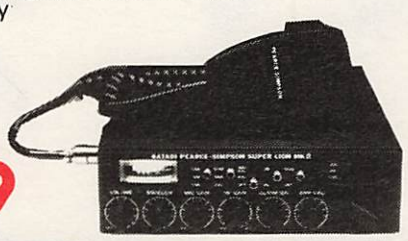

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## — FURIOUS FEWSTER TELLS IT AS IT IS —

### RESCUES, RESCUES and MORE RESCUES

The 'good' side of radiocommunications has been given plenty of publicity of late with EPIRBs and transceivers helping to locate downed aircraft and sinking ships...CB radio summoning assistance for stranded four-wheel-drivers in the middle of nowhere and a 'bushie wireless' operator receiving on-the- spot resuscitation instructions which enabled his mates to save the life of a young stockman who was zapped by lightning out west of Thargomindah.

### AND IT WASN'T JUST LUCK

In every instance media reports suggested that those in distress were ***'lucky'*** to have a radio or emergency beacon with them.

That's like saying someone who died of thirst in the desert was 'unlucky' not to be carrying water. Let's give credit where it's due...the fact that these people/planes/vessels were capable of calling for help indicates forethought, preparation, and a commonsense approach to safety.

***'Luck' played no part in it !!***

### ON A SOUR NOTE...

As I write this column the search for the missing vessel 'Rockin Robin' continues. It seems that the RAAF life-raft dropped to survivors ***was equipped with neither radiogear nor EPIRB...an omission which may have subsequently cost the survivors their lives.***

### LET'S BAN EVERYTHING INCLUDING CB RADIO

Bit of a panic in the Queensland Police camp recently when a Bundaberg magistrate found that the ***police had no written authority to use radar transmitters and were virtually breaching Section 26.1 of the Radiocommunications Act,*** however, if you think you can get a refund on the ticket you were issued back in 1970, forget it.

The loophole(if there was one) was closed within hours of the magistrate's ruling. The 'on again, off again' legality battle over radar detectors still hasn't been resolved and there are still mutterings about imposing a total prohibition on scanners.

***Now we can add CB radio to the list.***

NSW Police Inspector Geoff Luland (Port MacQuarie Traffic Services Commander) has suggested that not only radar detectors but also CB radios should be banned to help reduce the road toll. Inspector Luland's bailiwick covers the notorious stretch of the Pacific Highway where cars and buses and trucks have a tendency to meet head-on with sickening regularity. (A hundred- odd crashes, over half of them involving heavy vehicles, have claimed the lives of almost 150 people in the past two years on the Pacific Highway.)

Inspector Luland claims that the imposition of heavier fines won't improve road behavior in the long term.

He's probably right, ***BUT NEITHER WILL BANNING CB RADIO !!***

A CB's range on the highway is what, six or eight kilometres on a good day ?

'Smoky Reports' have to be ***LOCAL*** .... what's the use of knowing about a radar trap an hour's drive further up the road ? Has everyone forgotten the old 'flash-the-headlights' trick to warn oncoming traffic of radar traps ? I still see it practically every time I go out...even in the suburbs.

I agree with the good Inspector that ***SOMETHING*** has to be done about the carnage on our roads, but banning CB radio ain't it !!

### NEW CLUB NEWS

Newest CB club around is the Tweed Radio DX Group International, based just over the border in 'enemy' territory. The club's been going since early this year and already membership is climbing towards the 400 mark, with about 25 of these in Brisbane. Brisbane members hold an informal on-air 'meeting' each night complete with the odd visit from DX members, but unlike some obnoxious CB clubs I could name they don't pull the 'gerroff-this-is-our- channel' stunt.

The first few members on line each evening find an unused channel and latecomers have to hunt around for them. (Good move...I like it.)

Non-members are always welcome to join in the discussions and some 'drop- ins' have become members after finding the group to their liking. The on-air meetings are a pleasant change to listen in on after having your ears assaulted by Good Buddy drivel and endless calls of CQDX around the channels.

Filthy language is conspicuous by its absence, and topics of conversation can range from Aardvarks to Zulus. If you think it's worth a listen you'll usually find the 'Tweedies' between 30 and 40.

### GO DIRECTLY TO GOAL — DO NOT COLLECT $200

A young Taiwanese guy told me recently that a couple of months ago a 'foreigner' (nationality not known) was fined heavily...practically every cent he owned...and deported from Taiwan for using an illegal CB transceiver.

Anyone have any more info on this ?


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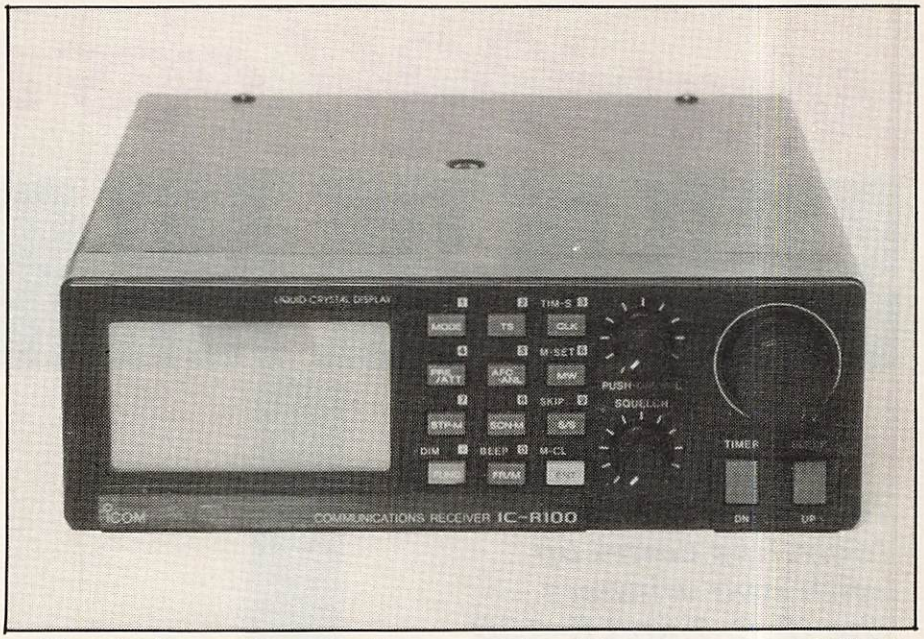
# New ICOM rigs are STATE OF THE ART RECEIVERS

***Not happy with following the pack, Icom has come up with two winners — the IC R-1 and R-100 are second to none in the frequency stakes. Scanning Action's Russell Bryant checks out the short and the tall of it all.***

## IN THE BEGINNING

Icom entered the scanner market a few years ago with the IC R-7000. Its frequency coverage and advanced features immediately attracted a devoted following. Last year Icom blew the market wide open with the IC R-9000, 1000 memories, frequencies from 100 kHz-2000 MHz left little that could not be heard. With a built in spectrum analyzer, exotic receive modes the IC R-9000 remains the,"You really want to know what I want for Christmas", scanner in everyone's dreams.

While the R-7000 is affordable, the R-9000 is certainly outside the budget of most scanner-users, excepting a well known media person of course. In addition neither sets could be considered for mobile use and definitely not for portable purposes. Subsequently, Icom noticed a void in both categories — price and portability. Enter the IC R-1 and IC R-100. Whilst not identical in specifications and frequency coverage, they are close enough that it doesn't matter.




## ICOM R-1 HANDHELD

The IC R-1 is a portable receiver. The first thing that strikes you about the rig is its size. It's small, 49mm W X 103mm H X 35mm D, and weighs 280 grams. For those who have trouble converting the dimensions into the real thing, that's about one match box wide, two match boxes high and about two deep. Included within is the ni-cad battery pack, rated at 7.2V. With a normal duty cycle the batteries can be expected to last around four hours.

Packed into that tiny package is a frequency coverage of 100 kHz-1300 MHz continuously, with FM narrow, FM wide and AM receive modes available to the user. Selectable tuning steps of .5, 5, 8, 9, 10, 20, 25, 30 or 50 kHz cover all listening applications, such as, shortwave, AM broadcasts, FM radio, VHF, UHF and 800 MHz. The IC R-1 comes standard with 100 memory channels, 80 are user programmable with the remaining 20 for storage of frequencies detected during search.

To avoid intermodulation and image problems, Icom has employed a triple conversion superheterodyne system for AM and FM reception. Wide band FM utilizes double conversion. Intermediate frequencies are, first 266.7-266.7095 MHz (depending on band), second IF 10.7 MHz and third 455 kHz. Selectivity is given as 15 kHz foR-AM/FM and 150 kHz for WFM.

Given the frequencies covered by the IC R-1, sensitivity naturally varies considerably, frequencies 2-25 MHz 1.6 micro-V AM, .79 micro-V FM and 6.3 micro-V WFM. On the higher band 5-905 MHz sensitivity is .79 micro-V AM, .4 micro-V FM and finally 3.16 micro-V WFM. Audio output, from what must be the smallest speaker in the world, is 150 mW at 10 percent distortion.

The IC R-1 has many features not seen on other scanners. Apart from the usual antenna connector (BNC) external power jack, external speaker output, controls such as LINE OUT for connecting to a tape recorder, RX (receive) indicator, RX CONT adjusts contrast of the LCD, from totally unreadable to dark and clear. A built-in clock adds to the advanced image of the IC R-1.

The antenna Icom supplies with the R-1 is primarily for VHF/UHF monitoring. It doesn't work well on shortwave unless the station is a powerhouse like HCJB Voice of the Andes, or Voice of America. To overcome the deafness on the High Frequencies a telescoping whip is almost mandatory. Icom does not supply one, however,they can be purchased from most shops selling the receiver.

Accessories accompanying the IC R-1 are carry strap, belt clip and BC 74V battery charger. The handbook is typical Icom — several diagrams to assist with programming and general operation of the receiver. The English is excellent, with few, if any, fractures of the written word.

Optional extras include five different battery packs which extend operational life many hours. Removal of a cap on the base of the R-1 permits attachment of external ni-cad packs. A choice of three carry cases will fit any configuration of battery that maybe fitted to the scanner. For rapid charging of all battery packs including the internal one, an optional desktop 'drop-in' charger is available. Other options are auto DC power cords, mounting brackets, headphones, external antenna (AH 7000 discone) and extension speakers.

## IC R-100

As I mentioned previously, neither the R-7000 or R-9000 could really be considered mobile. Sure provision is made for use in a motor vehicle on both sets, however their size is against it. Having filled the gap in the handheld market, Icom then set to work on a mobile wideband receiver. The IC R-100 was released around the same time as the IC R-1.

Frequency coverage is slightly greater than its portable cousin, starting at 100 kHz extending continuously to 1856 MHz. Again, three receive modes are provided — FM narrow, FM wide and AM. A variety of user-selectable tuning steps are available depending upon the band. Multiple scan functions, 24 hour clock and timer, full function LCD display as well as several antenna combinations make the IC R-100 a very desirable unit.

The memory capacity of the IC R-100 is slightly larger than the IC R-1, an additional 20 channels are supplied, giving a total capacity of 120. The variety of tuning step increments (1, 5, 8, 9, 10, 12.5, 20 and 25 kHz) correspond to any of the bands. Sensitivity is varied according to the band. On FM between 50 MHz and 905 MHz it is an excellent .2 micro-V. In AM mode on frequencies between

***R-100 has three banded antenna inputs with N-type socket for 50-905 MHz and 905-1800 MHz and an M or UHF (SO239) for .5-50 Mhz.***

.5 MHz and 1.63 MHz it is 3.2 micro-V.

Delivered audio from the bottom-mounted speaker is a very respectable 2.5 W, at 10 percent distortion. For optimum performance the IC R-100 is supplied standard with three antennae connectors. Each is banded for a particular frequency range, for frequencies 50-905 MHz and 905 MHz to 1800 MHz an N type socket is available for each portion. On the lower end of the spectrum, .5-50 MHz an M or UHF (SO 239) socket is fitted. Antenna impedance is 50 ohm (unbalanced) irrespective of frequency band. Provision is made for the attachment of an external antenna selector via a ANT SELector jack. The output supplies voltage corresponding to the band selected.

For local reception Icom supplies two aerials — for VHF/UHF monitoring a telescoping whip terminated with an N plug. To receive shortwave frequencies, a long wire antenna is included with the R-100...without unrolling it to its full capacity, the wire made all the difference on short wave. Mounted on the rear panel along with the three RF connectors are, the aforementioned antenna selector jack, extension speaker jack, clock on and off, 13.8 VDC supply socket and LCD contrast control.

Accessories provided are a fused DC power cord, heavy duty mobile mounting bracket and mounting hardware. As with the IC R-1 the instruction manual contains all the information necessary to safely and properly operate the receiver.

## AN OVERVIEW

The first thing most people ask is, ''do they receive sideband''?

When the answer is no, the response is something like, ''what good are they''?

For a start, if it was possible to have included SSB with the IC R-1 and IC R-100 don't you think Icom would have done just that?

To manufacture a receiver the likes of the IC R-100 and especially the IC R-1 given its size, requires a good deal of research and development. The biggest problem is stability...that is the radio's ability to remain on frequency with minimal drift. The R and D people at Icom decided, that unless a drift-free receiver could be produced, they were not going to compromise the good name of Icom.

The Icom IC R-1, does, at least in my opinion, have a number of intrinsic problems, all of which can be traced to its compact size. It is too small for my liking and Icom obviously believes that a happy medium has been reached by trading off a small amount of performance in order to keep it contained within the diminutive case.

Don't get me wrong, the IC R-1 is still an excellent performer. It stands alone with frequency range, scan functions, tuning steps and additional features. To compare it to a full size base or mobile scanner or receiver is unfair. When investigating the IC R-1, don't try to compare it with anything...treat it as a unique unit.

The IC R-100 is a different story. It is not hard to like the mobile rig, with the exception of one thing which is not a criticism of the radio, more of Icom Japan. Intermodulation, image rejection, selectivity and crisp clear audio certainly endeared the receiver to me. I like the choice of RF connectors, the sleek uncluttered look as well as the extra features Icom includes in their radios.

My one overall dislike, which is applicable to all Icom receivers, is the use of terms, such as 'Memory Write' and 'Memory Read' in lieu of 'Program' and 'Manual'. The reason for the different terminology? Well it is in line with the amateur rigs Icom produces, keeping all functions similarly labelled. I fail to see the logic, given that the majority of purchasers will be non-amateurs. I know why, however I don't like it.

The IC R-1 retails for around $725.00 and the IC R-100 for $1020, both receivers represent radio technology at its highest. To coin a phrase, ''state of the art''.

Thanks to Icom Australia for the loan of both communication receivers.

## David Flynn tries his hand at predicting . . .

# THE SHAPE OF THINGS TO

***My good mate Andrew is a wiz on all things radio. Andrew has much sense for a young blade — a sense of priorities (the good life first, radio second), a sense of the ridiculous, and some peculiar in-born sense that makes the intricacies of radio mere childs' play to him.***

My own ten year age advantage is never no mind, Andrew runs rings around me and most people I know in the business. He's also a wee bit proud, a trait we use to steam him up without the slightest bit of guilt.

Take the Tale of the Mobile Ham Radio. Andrew breezed through the full-call amateur licence recently and decided to outfit his car with some ham gear. Already having a duo-band VHF/UHF handheld, the first true mobile installation was a Uniden HR-2510. This is an excellent radio which gives you SSB, FM and AM on the 10 metre ham band with 25 watts output, memories, scanning and more, plus top-class performance and build quality. Andrew bought the rig to do some local work on 10FM, try some mobile skip and have the right stuff for an instant DXpedition up the mountains if there was nothing else happening on a given evening. Very respectable for all but the most hide-bound ham. His problem is that to the untrained eye the HR-2510 looks like a sideband CB.

### "Oh, YOU'VE GOT A CB RADIO"

So most everyone who sees the 2510 says "Oh, you've got a CB radio !", which causes Andrew — ever conscious of his image — embarrassment and frustration in equal parts. 477 MHz, maybe; sideband, when there's skip. But a whopping CB rig having pride of place in the car of a young lad seems to make one an instant rev-head or under-sexed teenager, neither of which is the case. And Andrew is getting tired of hearing "Oh, you've got a CB !" from people, especially cute young things who once in his car

*The trend to mini-rigs, particularly for mobile operation, will eventually result in 27MHz rigs looking similar to these ICOM 144MHz FM transceivers.*

# COME

insist on keying the mike and calling "Breaker, breaker, anyone gotta copy ?" on the amateur channels. Which brings us in a roundabout fashion to the issue at hand. Have you noticed that in many ways CB and amateur radios are becoming more and more alike ? We're obviously not comparing the cheap AM rigs with those all-band DX machines costing as much as a small car. But consider the slow convergence between the better mobiles from 27 and 477 MHz, and their counterparts on the amateur bands. These and commercial radios too are sharing looks, features, technology. Why is this, and how does it shape the CB radio of the nineties ? It was during the early and mid-seventies that commercially-built HF amateur transceivers and CB radios made their impact felt, and they were both very different beasts.

## VALVES AND CONTROLS GALORE

Ham rigs, embodied by such as the Kenwood 520 and the Yaesu FT-101, were big radios with valves and controls galore. You really had to know what you were doing to drive the thing. You didn't seriously use these rigs mobile, they were intended for the shack and the Yagi and the long-wire stretched across the backyard. CB radios were simple because they were made for the average Joe and for what was essentially a mobile service. It was the development of the mobile ham HF rig which changed all this, spurred on by the two symbiotic, mutually-dependent factors that have molded our civilization — technology and marketing. It was the technology which allowed a HF transceiver to be made small enough for the car — high-efficiency power transistors replaced final stage valves, innumerably more transistors were packed into ICs to minimise discrete components, the phase locked loop saw an end to crystal banks. And lately they've added a completely new generation of marvels — the EPROM, the surface-mounted device, the custom- built microchip. It was marketing which both led and followed this trend. The manufacturers needed a new market. Once your customer has bought that dream rig for the shack, you might never again see him or his money. So you get him to buy something else, and what better than a complementary rig for the car ? Let's face it, the VHF and UHF bands were made for mobile use, so you merely extend the concept to HF.

## THERE ARE CERTAIN DESIGN CONSIDERATIONS

A mobile rig, any mobile rig, faces certain design considerations, and this is what led to the similarities between CBs and the newest breed of ham mobiles. Once again, remember that we are dealing only with those rigs that operate on a single band — most often the 28 MHz (10 metre), 144 MHz (VHF 2 metre) and 430 MHz UHF 70 cm bands. Regardless of the band, they are mobiles which perform a similar function. (This is an interesting aspect. I have pointed out to young Andrew that he uses his 28 MHz ham rig for the same reasons that most of us use a 27 MHz CB rig, these being local chit-chat and DX. For this reason I argue the rig does nothing more than a CB set, it only does it differently. So why shouldn't it be thought of as a CB rig ? After all, if it looks like a duck and quacks like a duck, it's a duck ! This line of argument is guaranteed to get a response every time.)

## THEY HAVE THINGS IN COMMON

Here is what mobile transceivers have in common. They have to be small, or at least small-ish. Because the driver doesn't have time to fiddle around with tuning, the radio will have a frequency selector with detents and ideally click-stops from one frequency to another. And as frequencies tend to be long numbers it is convenient to treat them as 'channels', easier to remember and easier to display on a readout (which will be digital). If there are a lot of channels you might build in a memory bank. You'll also whack in a meter, probably digital; and maybe electronic stepping through the channels. This won't apply to every mobile, but certainly to most. There is no copyright on good design sense.

The whole process is what Charles Darwin called 'Convergent Evolution', that two creatures subject to the same environment and influences will develop the same traits and so come to look very much alike, even if they are totally different species. An example is the Tasmanian Wolf, which isn't really a wolf at all but a marsupial.

**(continued over)**

*These UHF FM transceivers could well be in the UHF CB mobiles of tomorrow.*

# THE SHAPE OF THINGS TO COME

It is no closer relation to the canine family of wolves, dogs and dingos than we are, but because it has evolved in the same environment as the canines it shares many of the characteristics essential for survival in those conditions. And here again "if it looks like a wolf and barks like a wolf, it's a wolf !" These modern push-button amateur radios, from mobiles right through to competition-grade powerhouses, tell us something about the amateur hobby. Perhaps hams are just adapting their ways to suit the radios, but, they are operating mobile and even base rigs as many CBers do, in the same way and with the same end result.

### A CHANGING MARKET

This has been the direction for the last decade and is even more the way ahead — the way of the operator rather than the builder, the enthusiast rather than experimenter. And the industry has adapted to a changing market. An unkind critic may suggest this is just as well, since most hams themselves have refused to adapt for years, holding blind faith in CW and the sacred mysteries of the airwaves while personal computers steal converts from the fold. The same critic might even point out what Darwin had to say about survival of the species — that evolution (convergent, divergent or any other flavor, madam) is the only option to extinction. Meanwhile, there's evolution of the convergent kind between the worlds of CB and amateur radio. One aspect, that of using 'channels' instead of frequencies, sprang from CB rigs modified to the 10 metre band. This was all the rage in the late 70s and earliest 80s, as it allowed novice amateurs to get on the air quickly and cheaply using their newly-licenced skills into the bargain.

It started in the USA when in 1978 the FCC decreed that 23 channel rigs could not be sold — a move designed to hurry the newer and improved-spec (read 'less interference') 40 channel units onto the streets. The market for 23 channel rigs, already dying before this decision, was now stiff as a board and ready for the deep six. Factories with countless thousands of rigs still unshipped sent the gear to Australia and other fresh fields. Stateside retailers and wholesalers had no such option, so they first slashed prices and then gave rigs away (literally, because it was illegal to sell them) to amateur clubs, whose members migrated en masse to 10 metres.

Rigs were also swung over to the 10 metre FM band, so this was an early landmark in the pirates' trend towards 27FM (which has nothing to do with this article, but the question does appear in the Pirates' Edition of Trivial Pursuit, so take note !).

### CB RIG TO 10 METRE RIG

American ham mags started printing 'CB-to-10' modification projects which gained favor around the world, and an immediate effect of this was the birth of a de facto channel system. A portion of the 10 metre band was divided into 23 channels to simplify things. Whereas amateurs used to talk in frequencies, some — predictably those young ones newest to the hobby — were now heard to say 'QSY channel 16'. Gasps of horror from the old-timers, wondering if their trusty Collins had drifted onto 27 MHz overnight. This wasn't limited to ex-CB rigs. Unveiled around the same time was the Comtronix FM-80, the world's first mass-production 10 metre FM rig. This mobile broke the top end of the band (28.9 — 29.7 MHz) into 80 'channels', using a 40 channel tuner and an A/B bank switch. This great little radio looked more like a CB rig than most CB rigs themselves — convergent evolution in action. A similar trend became evident in VHF and UHF amateur sets. No manufacturer ever imposed a 'channelisation' on the bands, except for Philips' brief and ahead-of-their-time experiment with the FM-321 70 cm rig. But the bands lent themselves to such nomenclature, using the last four digits of the frequency itself rather than some obscure reference based upon the artificial limits of channel switch or circuitry. So 146.500 MHz is known as '4600', and 438.375 MHz as '8375'. Where these rigs make their mark on the UHF CBer is the amazing level of features they offer, from front-panel tricks to GaAs FET RF amplifiers and at least 25 watts up the stick. You'll pay a bit more for such a rig than your 477 MHz transceiver, but when you look at the modern 70 cm mobile are you seeing the ancestor of a UHF CB to come ? Any new VHF or UHF amateur mobile would kick a 477 MHz rig to death in most departments, but only because of the market size — a world market versus that of a single country. There are economies of scale at work here. The larger the market, the higher the demand and potentially the greater the profit. The more gear you make, the less expensive it all becomes and maybe the larger your slice of the market.

### YOU NEED AN EDGE

But, you'd better have something to give your product the edge, because there's competition for every dollar. So you try to make your radio smaller, better, cheaper than the other fellow's. All of this can be packed into a UHF CB but it isn't worth it, doesn't pay dividends. So we won't see some super- charged 477 MHz rig. What we will get, and have been getting for years now, is the raw technology behind this. From this come rigs that run at 5 watts without building up a sweat. Transmitters that are more stable. Receiver front ends with improved gain and less inherent noise. Chips that can handle multiple memories, scanning, priority and dual-watch functions. What CBers gain from the modern amateur mobiles and their commercial cousins is a wave of techniques and features undreamt of ten or even five years ago. Think back to the 477 MHz scene in 1985. The IC-40 handheld had just been released, and wasn't it great ? No frills or features, but a quality UHF CB handheld was all we wanted at the time. Now, just five years on, look at he IC-40G. This is how far UHF CB has come, and only because of the trickle-down effect of technology from the amateur and commercial VHF/UHF radios.

The same can be said for an AM/SSB rig, although the changes are not as dramatic. It is true that the rigs implementing these new technologies are not the cheapest around, but they set a benchmark which shows it can be done at a realistic price. Some technologies are so superior that they will eventually replace the bottom end of the scale; surface mounted components are making such inroads that eventually a rig built to 'low-tech' standards will be bigger and more expensive than had it used SMCs because of the volume of SMC work, availability of components and manufacturing techniques. Don't expect to see the ham rig of today become the CB of tomorrow or even next Wednesday. Some radios, yes, but in degrees and in their own time. The best example here might be Uniden's two stablemates — their own HR-2510, and the Realistic-badged HTX-100. A bit of re-working and something of this nature could easily become the new top-shelf sideband of '91. But, you can be certain that the raw materials of such radios will continue to find their way into CB rigs around the world — yours, mine and even my good mate Andrew's.

**NOTE: Skip conditions are virtually the same from Sydney as they are for all other East Coast areas — likewise Perth predictions can be taken as similar to those for other West Coast areas.**

DATE AUGUST 1990 — ADDRESS NO. 8303

```
SYDNEY-JAPAN                7825
27.0 FMMMMMMMMF%.....     %MMF
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-C&E.COAST USA       15712
27.0 ...                   .....
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-NORTH AFRICA        17109
27.0      .%%%..
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-ENGLAND LR          23031
27.0                        ..
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-CENTRAL EUROPE       13575
27.0      ...%%...
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST INDIES          18005
27.0 %%%%%%%..              %
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-NEW ZEALAND           5255
27.0 %FFF%%%.              .%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST AFRICA LR       26220
27.0          .%.           .
   MHZ !    !    !    !    !
      00   06   12   18   24

ADELAIDE-P.N.G.             2960
27.0 FFFFF%%%%.            FFF
   MHZ !    !    !    !    !
      00   06   12   18   24
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```
SYDNEY-MIDDLE EAST         12903
27.0   .%%%%F%.
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST COAST USA      11951
27.0 %MMM%M%%...           %%%%
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-PAPUA NEW GUINEA     2740
27.0 FFFF%%%%..            .FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST AFRICA LR      23596
27.0 .    ..   .           %%..
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-SOUTH AFRICA          8315
27.0      %FMMM%%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-SOUTH AMERICA        14569
27.0  %%%%...
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-ENGLAND SR           14480
27.0        .......
   MHZ !    !    !    !    !
      00   06   12   18   24

MELBOURNE-P.N.G.            3157
27.0 FFFFFF%%.              FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

BRISBANE-NEW ZEALAND        2506
27.0 F%%%..                .%%F
   MHZ !    !    !    !    !
      00   06   12   18   24
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```
SYDNEY-CENTRAL EUROPE      16090
27.0       ......
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST INDIES         14950
27.0 F%%%%..               .FFFF
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-ENGLAND SR          16993
27.0        .....
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-JAPAN                 7923
27.0 MMMMMMMMMM%%....       .M
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-C&E.COAST USA        18614
27.0 ...                    ..
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-NORTH AFRICA         13941
27.0      .%%%.%%.
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST AFRICA SR       13804
27.0 .     %FFF%.
   MHZ !    !    !    !    !
      00   06   12   18   24

BRISBANE-P.N.G.             2090
27.0 F%%%.....              %%F
   MHZ !    !    !    !    !
      00   06   12   18   24

ADELAIDE-NEW ZEALAND        3214
27.0 FFFFF%%%.              %%F
   MHZ !    !    !    !    !
      00   06   12   18   24
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SYDNEY-SOUTH AFRICA        11036
27.0     %MMM%.
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-SOUTH AMERICA       13180
27.0 FFFF%%%.              .FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST AFRICA SR      16428
27.0 %%.    .%.             %%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-MIDDLE EAST          10077
27.0   %%MMMMMMF%.
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST COAST USA       14743
27.0 %%%%%.                 %%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-PAPUA NEW GUINEA      4073
27.0 .%%%%.....             .
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-ENGLAND LR           25544
27.0          ...
   MHZ !    !    !    !    !
      00   06   12   18   24

HOBART-PAPUA NEW GUINEA     3711
27.0 FFFFFFFF%.             .FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

DARWIN-NEW ZEALAND          5321
27.0 FFFFF%%.              %FF
   MHZ !    !    !    !    !
      00   06   12   18   24
```

These GRAFEX style predictions present in pictorial form the expected HF propagation conditions between Australia and a number of important DX areas. For each circuit, the "East" terminal refers to the eastern half of Australia. The horizontal axis of each graph represents the hours of the day in Greenwich Mean Time from 0000 hours to 2300, reading left to right. The vertical axis represents increasing frequency.

A GRAFEX symbol represents the predicted propagation conditions for a particular frequency at a particular time. The meaning of each symbol used is given in the key on the next page. The letter "F" designates the best conditions for HF communications.

**Grafex prediction charts supplied courtesy of the Ionospheric Prediction Service, 162-166 Goulburn Street, Darlinghurst, NSW.IPS offers pre-recorded telephone information. To access the service, please phone (02) 269 8614.**

**LEGEND TO GRAFEX SYMBOLS**

- . Propagation is possible but probably on less than 50% of the days of the month.
- % Propagation is possible on between 50% and 90% of the days of the month.
- 'F' Propagation is possible by the First F modes on at least 90% of the days of the month.
- 'E' Propagation is possible by the E modes on at least 90% of the days of the month.
- 'M' Propagation is possible by both the First and Second F modes on 90% of the days of the month.
- 'S' Propagation is possible by the Second F mode on 90% of the days of the month.
- 'A' High absorption — above the ALF but probably too close to it for good HF communication.
- 'X' Complex mixture of modes including the Second E mode.

DATE SEPTEMBER 1990 — ADDRESS NO. 8303

```
SYDNEY-JAPAN                7825
27.0 MMMMMMMMMFFFFF%..     MMM
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-C&E.COAST USA       15712
27.0 %%          ..       .%%%%
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-NORTH AFRICA        17109
27.0      .FFFF%. ..        ..
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-ENGLAND LR          23031
27.0          .             ..
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-CENTRAL EUROPE       13575
27.0      .%%%%%%%....
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST INDIES          18005
27.0 %%%%%%%..              .%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-NEW ZEALAND           5255
27.0 %%%%%%%..              %%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST AFRICA LR       26220
27.0 %%%%%.  %F%.....      %%%
   MHZ !    !    !    !    !
      00   06   12   18   24

ADELAIDE-P.N.G.             2960
27.0 FFFFFFFFF%.....       .FFF
   MHZ !    !    !    !    !
      00   06   12   18   24
```

```
SYDNEY-MIDDLE EAST         12903
27.0   %FFFFFF%.....
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST COAST USA      11951
27.0 MMMMF%%....    . .%MMMM
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-PAPUA NEW GUINEA     2740
27.0 FFFFFFFF%.....        %FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST AFRICA LR      23596
27.0 %%%%.. .%%%%%...      %FF%%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-SOUTH AFRICA          8315
27.0      %MMMM%%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-SOUTH AMERICA        14569
27.0 .%%%%%%%. %.          .
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-ENGLAND SR           14480
27.0        ..%%%%%....
   MHZ !    !    !    !    !
      00   06   12   18   24

MELBOURNE-P.N.G.            3157
27.0 FFFFFFFF%.....        %FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

BRISBANE-NEW ZEALAND        2506
27.0 %%%%%..               %%%
   MHZ !    !    !    !    !
      00   06   12   18   24
```

```
SYDNEY-CENTRAL EUROPE      16090
27.0       ..%%%.....
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST INDIES         14950
27.0 FFF%%%%.    ..        %FFFF
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-ENGLAND SR          16993
27.0        ....%.....
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-JAPAN                 7923
27.0 MMMMMMMMMMFFFF%..      .MM
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-C&E.COAST USA        18614
27.0 %.              ...    .%%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-NORTH AFRICA         13941
27.0 .    .FFFFFF%..        .
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST AFRICA SR       13804
27.0 %...  FFFFF%.
   MHZ !    !    !    !    !
      00   06   12   18   24

BRISBANE-P.N.G.             2090
27.0 FFFF%%%%..    ..       .FFF
   MHZ !    !    !    !    !
      00   06   12   18   24

ADELAIDE-NEW ZEALAND        3214
27.0 %%%%%%%..              .%%%
   MHZ !    !    !    !    !
      00   06   12   18   24
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```
SYDNEY-SOUTH AFRICA        11036
27.0     .MMMM%.
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-SOUTH AMERICA       13180
27.0 %%%%%%%.              .%%%%
   MHZ !    !    !    !    !
      00   06   12   18   24

SYDNEY-WEST AFRICA SR      16428
27.0 %%%..  %%%.              ..%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-MIDDLE EAST          10077
27.0   %MMMMMMMF%%....
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-WEST COAST USA       14743
27.0 FFFFF.          .     %FF
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-PAPUA NEW GUINEA      4073
27.0 %%%%%%%%%.             .%
   MHZ !    !    !    !    !
      00   06   12   18   24

PERTH-ENGLAND LR           25544
27.0          ....
   MHZ !    !    !    !    !
      00   06   12   18   24

HOBART-PAPUA NEW GUINEA     3711
27.0 FFFFFFFF%%.....       FFFF
   MHZ !    !    !    !    !
      00   06   12   18   24

DARWIN-NEW ZEALAND          5321
27.0 %%%%%%%.              .%%%
   MHZ !    !    !    !    !
      00   06   12   18   24
```

# DX INTERNATIONAL

## WHAT'S BEING HEARD ON THE DX CHANNELS — JACK-67-W-07

**Conditions on the band have been poor recently, reflecting those of the September/October, 1989, edition of this column. I sat up five evenings in a row, waiting to see if the band would open up. It did not. Europe fizzled out early in the evening. Even before that, its signals were so poor they were not worth chasing.**

As mentioned in previous columns, I have had my doubts about Sunspot Cycle 22 delivering the goods. All in all, the Cycle 22 period has been absolutely hopeless for most of the time. Compared to previous Sunspot Cycles, this Cycle 22 has turned out to be a dud.

We all know what it is like on the call channel when the band is open. Yes, there is so much yapping going on you cannot understand a thing. This, however, does not give a minority group of brain dead fools the right to abuse overseas stations with racial talk and four letter words. This was what happened a few weekends ago, when I heard a group of rather stupid and biased so-called "Australian DXers" abuse some New Caledonian DXers.

The verbal abuse and racial slurs, specially from the Australian stations, were so bad I could not repeat them in this column. Okay fellows, so the band is wide open to New Caledonia. Its stations have a right to place calls, as you do. If you don't want to listen to the congestion on the call channel, listen around elsewhere on the band.

There was no need for the frivolity I heard. It was totally uncalled for and only added to Australia's reputation as a land of "sloppy" DXers.

Some DXers are still confused about the IOTA point islands. IOTA stands for Islands On The Air. Most radio clubs offer awards to those who work a certain number of IOTA point islands but these IOTA islands are not new countries. Take, for example, two islands within the boundaries of Australia — let's say Kangaroo Island, in South Australia, and King Island, in Bass Strait, or even Thursday Island, in the Torres Strait. These three islands are all part of Australia. If an overseas DXer worked one of these islands, it would count only as a 43-AT Division contact, as the islands mentioned are not sufficient distance from the Australian mainland to count as new countries. Thus, the IOTA point system.

One must also keep in mind, Maritime Mobile contacts do not count as new countries either. If you worked a M/M off the coast of Egypt, for example, this does not count as having worked Egypt. Ships and other vessels at sea do not count as DXCC countries, regardless of the coastline they are M/M off. You have to work a land mobile or a fixed station to make it count.

### AFRICAN & INDIAN OCEAN REGIONS

Some good, but often brief, openings have been heard from this region but you have to be around at the right time to take advantage of this. An easy one to work is Gene, who signs as the WA-88 from Cocos Keeling Island. Gene was five by seven at 0609z. I think, by now, everyone should have this one in the bag, so to speak.

Pretoria, in South Africa, has been around, by way of Tom, who signs as the FT-74. At 0550z, Tom was a good, steady five by three, peaking a six at times. A surprise appeared — BA-185, name unknown logged at 0245z, transmitting from the Comoro Islands. His signal was feeble, at only a four by one.

Mauritius Island has been about, by way of 168-ICA-02, name unknown. He was heard at 0847z, with a reasonable five by five signal report and it seemed he was content working the Europeans only and was, no doubt, getting them a lot stronger than we were.

The Republic of Namibia was monitored at 0651z, by way of 74-NR-101, operated by Worden. Although the band was poor, Worden managed to move the meter to a steady five by three before fading out at 0702z.

Another station from Botswana has appeared, by way of 105-BO-102, and is operated by Annie, the wife of Gunther, the 105-BO-101. Annie was logged at 0720z, with a good five by five signal, from their home at Ghanzi, in Botswana.

A Martime Mobile has made some appearance on the band from the Maldive Islands on odd occasions. The yacht, called TRINITY, heard at 0431z and operated by Sol, who is the owner and captain, was a five by four signal. Sol plans to head north to Sri Lanka in the next two to three weeks, weather permitting.

***Station "North" is a regular and runs a Super-Star 3200 into a City-Star antenna with signals usually around 5/5.***

A weird one appeared on the band at 0658z, by way of REBEL RADIO. Although the English and modulation was indifferent, I did get the location as "somewhere within" Angola, West Africa. The signal was quite faint being four by one.

## MIDDLE EAST & ARABIA

From time to time, the Middle East has been coming in better on the longpath than on the shortpath, keeping most avid DXers on the alert for a new country. Persistent rumors have been going around that there is some Italian fellow, operating from Libya, although I have not heard from anyone who has worked him yet. So, keep your ears open to the speaker. The 1-KA-102, operated by Mohammed, has been very active from Kuwait. He was logged at 0928z with a stead five by five signal and was working a pile-up of Australian and Indonesian stations.

George, the WAC-563, was heard operating Maritime Mobile, off Saudia Arabia at 0923z, and George was a five by four signal. At 1005z, I heard an enormous signal from Fahed, who operates as 102-WW-05, in Kuwait. Fahed was a very strong five by nine, plus 10DB over, and the signal held quite well for some time. Fahed was closely followed by Fadel, who signs as 102-AT-110 and, at 1020z, Fadel was a good five by seven.

Abu Dhabi, in the United Arab Emirates, appeared briefly by way of Faizel, who was signing as the 94-AR-101, and, at 0755z, Faizel was a reasonable five by three but subjected to heavy fade.

Another rumor doing the rounds is that a Norwegian chap is active from Bahrain. I have yet to hear him or from someone who has. His callsign is unknown.

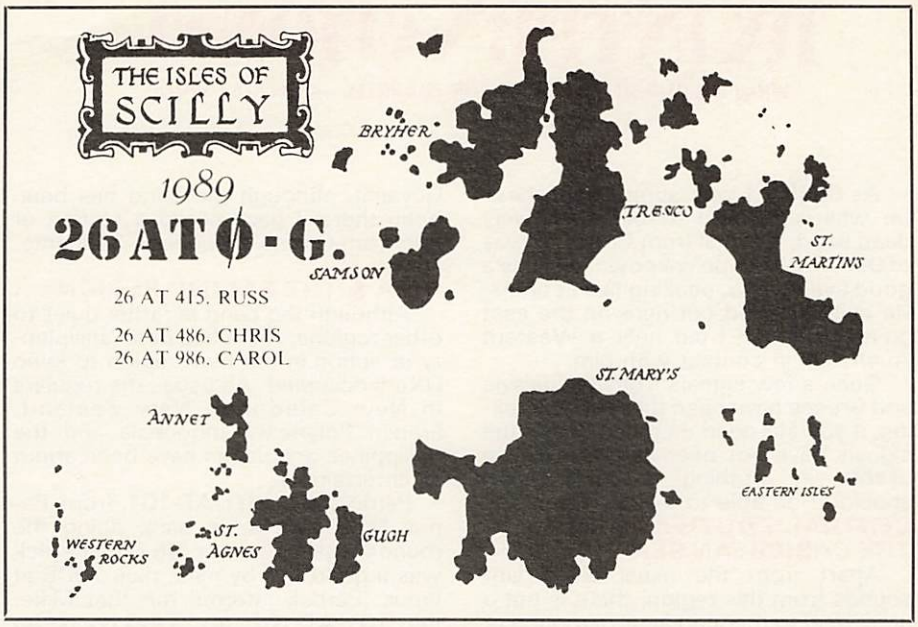
At 0520z, one evening, I heard a swag of Italian and French stations, calling a station "959" in Yemen, but nothing was heard this way. A good one to keep an ear open for.

## EUROPE

The shortpath to Europe has been indistinct recently. The longpath in our mornings hasn't been all that crash hot, either. There are some rather good, but often brief, openings about at times, however, providing, of course, you are about the radio at the time the band decides to open.

Poland was noted on the band at 0817z, by way of Andy, who signs as 11-LA-1. Andy was only a five by three, peaking five, and had no trouble picking a contact or two in the Pacific region.

Also from Poland was EC-105, operated by Stan, near Warsaw. Stan was a four by one at 0756z and was only using a mobile antenna on the guttering of his house — not a bad effort, considering Stan was only running 12 watts from his base radio.



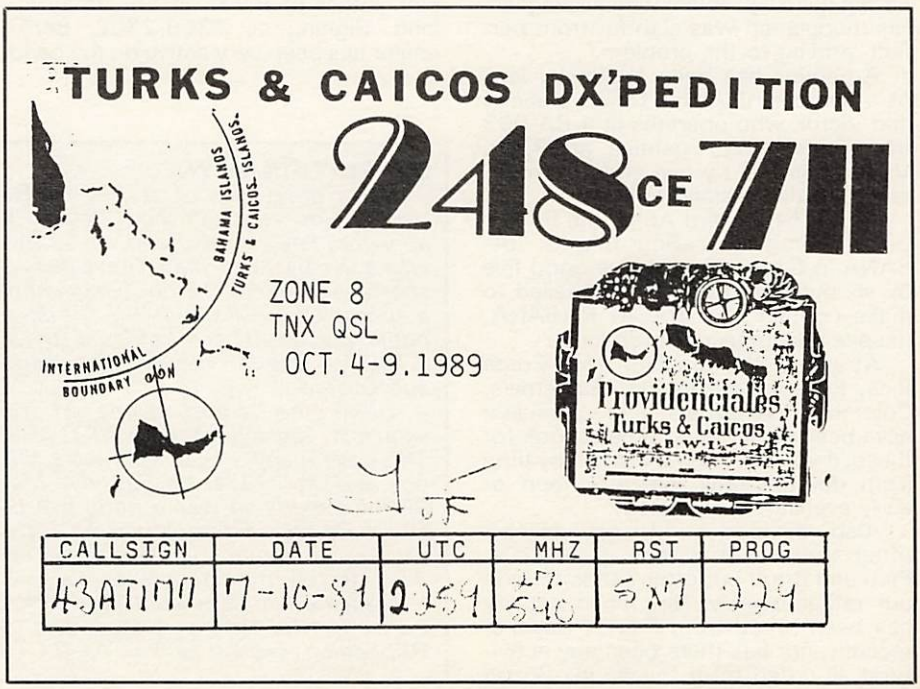

***Russ, the 26-ATO-G, operates out of St Agnes Island in the Isles of Scilly group.***

Hungary has been about, by way of MW-222, operated by George, and, at 0751z, George was a five by two and was looking for Japan only. He refused to acknowledge calls from Australia and Indonesia.

Via the longpath, it has been possible to get a few contacts into the islands of south western Europe. At 0130z, I logged the 75-AT-112, operated by Oscar in the Azores Islands. Oscar was five by five and he was soon followed by 34-AT-121, name unknown, in the Canary Islands. At 0150z, he was a good five by seven report. I also logged a number of stations from the Balearic Islands, Spain, Portugal and Gibraltar, right up until around 0245z, and with reasonable signals.

As usual, the Italian, French, Dutch and German stations have been about on the shortpath. Anytime from around 0500z, they start to come through, although the signals are down a bit on what we used to get. On odd occasions, the odd thumping signal from Scandinavia comes through, although, by now, I think most of us have them already and are looking for something new.

***A QSO into the Turks & Caicos Islands is rare even for the fullcall amateur, this QSL is a result of a DXpedition which took place late last year and was very welcome by all serious DXers.***



# DX INTERNATIONAL

**WHAT'S BEING HEARD ON THE DX CHANNELS — JACK-67-W-07**

At 0645z, I was surprised to hear, on what appeared to be a relatively dead band, a signal from Crete, by way of 90-CR-01, name unknown. He was a good five by two, peaking five at times. He quickly faded out here on the east coast, although I did hear a Western Australian in contact with him.

Quite a few signals from Yugoslavia and Greece have been there for the taking, if you still need them. Although the signals have not been good, they are usable — nothing a good beam shouldn't be able to tackle.

## CENTRAL/SOUTH AMERICA & THE CARIBBEAN SEA

Apart from the usual discordant sounds from this region, there is not a great deal to mention at all, although at 2130z I logged PP-490, operated by Julio on San Andres Island. Julio was a good five by six and had no shortage of takers.

Falkland Islands stations are still around, this time by way of Colin, who signs as the UK-606. I heard Colin at 2001, with a rather faint four by one report, and he proved most difficult to hear, let alone secure. A station calling itself RADIO HABANA was noted at 2209z, from somewhere in Cuba. The signal was good, at a five by five, but the modulation left a lot to be desired. One station in the USA labelled this one as slim.

The odd station from South America has been coming through quite well and, at 2310z, I heard VVC-722, operated by Carlos from La Paz in Bolivia. Carlos was a five by seven but was having quite a problem with his English. His modulation was also far from perfect, adding to the problem.

Argentina has been about, by way of a number of Alpha Tango stations and Victor, who operates at 4-RA-003 from Tucuman in Argentina, at 2320z. Victor was five by five and after contacts in New Zealand only.

At 2345z, I heard Anna, the 67-PR-03 in Paraguay, calling RADIO HABANA in Cuba. Anna was a good five by six but fading heavily. She failed to make contact with RADIO HABANA, despite her impeccable Spanish.

As usual, the regulars from Costa Rica, Panama, Nicaragua, Guatemala, Colombia, Venezuela and Suriname have been about. Best time to look for these, if you still need them, is any time from daylight until late afternoon or early evening, at the latest.

Also, the odd good signal or two often appears from regulars in Chile, Peru and Brazil but often tends to fade out rather quickly. Not much activity has been noted from French Guyana, recently, nor has there been any activity at all noted from Guiana (ex-British Guyana), although the band has been open there. I have noted a station or two from Guiana's neighbor, Suriname.

## ASIA & THE PACIFIC REGION

Although the band is rather quiet to other regions, there has been still plenty of action in our own region to keep DXers occupied. As usual, the regulars in New Caledonia, New Zealand, French Polynesia, Indonesia and the Philippines and Japan have been about to entertain us.

Patrick, the 101-AT-101 from Papua New Guinea, is back doing the rounds again and, at 0612z, Patrick was a good five by nine, plus 20DB at times. Patrick informs me that Mike, the 101-AT-102 (ex TA-31), is no longer in Papua New Guinea and there are still quite a few people chasing him for QSL cards.

Kiribati has been active lately, by way of 266-SR-101, operated by Beriki, on Christmas Island. Beriki was logged at 0450z with a good five by seven report.

Abemama Atoll appeared on the band, by way of RK-400, operated by Tawita, in the Gilbert Island Group of West Kiribati. At 2340z, Tawita was a five by four signal. Sorry, Tawita does not QSL at all.

Auckland Island is supposed to have activity, by way of RA-939. At 0253z, I noted a number of stations chasing him. I failed to hear him at all. Maybe a slim?

Tarawa Atoll, in West Kiribati, has been very active by way of Beriki senior, father of Beriki, in Christmas Island. Signing as T3CB-2302, Beriki senior has been very active on the band and, at 0510z, he was a good five by seven here. Beriki senior reports that popular Christmas Island DXer, the PI-001, operated by "Big Eddy", is off air and taking his holidays on Tarawa.

Tonga is still about the band from time to time by way of regular, John, who signs as 96-AT-101. John was noted at 2205z with a good five by nine plus 10 signal and, again, at 0455z, with a five by six signal.

The 132-AT-101, operated by Aledn, in Majuro, Marshall Islands, was heard on the band at 0130z, while playing host to 43-AT-421, who launched a small DXpedition to the group. Alden was a five by six.

A Maritime Mobile off Macau has been active. Signing as 240-SR-0, he was logged at 0830z and was a five by five signal.

Report has it that the Far East Radio-01, operated by Dave, from Singapore, is for real and not a slim. It is not clear whether Dave is issuing any QSL confirmation. I am sure many DXers need Singapore confirmed. Dave was heard here at 2337z and was a good five by seven.

Taiwan is becoming more and more active, these days, with lots of new stations appearing on the band. At 0826z, I monitored TW-200, operated by Sam, and he had a very good signal at five by nine by 20DB. Sam gave his location as Taipei, the capital of Taiwan.

Also from Taiwan, I logged TW-459, operated by Chaug, at 0750z. Chaug was a good five by nine signal and also gave his location as Taipei.

Old regular, Pedro, who signs as the DELTA GULF RADIO-03, was heard Maritime Mobile at 0910z, off Bombay port in India. Pedro was a five by three and was just about to close down before the vessel entered the port area. Pedro is still aboard the cargo ship, MARIA-S.

### DXPEDITION NEWS

*Not a great deal of activity in this department, although the 132-AT-KX appeared late one day and, at 0245z, was a five by seven here. Steve had no shortage of takers. It is unclear whether a special QSL will be issued. To date, nothing received here. Cards go to 43-AT421, Steve, return postage appreciated.*

*Desecheo Island appeared, on schedule, signing as 299-AT-O-KP9. This gave many a chance to work this one and, at 2115z, on Saturday May 26 the expedition was a good five by five here in eastern Australia. QSL cards (with contact number) go to 11-AT-110, return postage essential.*

*Madeira Islands should have come on air by the time you read this. A DXpedition, signing as 119-AT-0-CT3 was due to appear during July 8-15. QSL via 14-AT-479 in France.*

*Crete will play host to a DXpedition, signing as 90-AT-0-SV9, during November 9-11, if all goes well. QSL cards (with contact number) should be sent to 18-AT-104 with return postage.*

*Nauru Island appeared briefly from May 31 to June 4, signing as 271-NI-01. Quite a few DXers in New Zealand were put through and some Australians, who were also on the pre-arranged list. No QSL information as cards were sent from Nauru.*

*Not much news this edition, because of work and a poor band. As usual, thanks to those who kept me informed. Let's hope things will be better next issue. 73 Good DX, Jack.*

# CB ACTION

## Hatadi Electronics Corporation Pty Ltd

# WORDMAZE

Our winner of the July/August Wordmaze and of the superb Electrophone TX-475S handheld UHF plus a long-life BP-1000 battery pack and matching heavy-duty carry case from Marktronics and Captain Communications plus a 3 db flexible whip antenna from Mobile One is H. Lim of Wheelers Hill in Victoria.

His was the first correct entry opened containing the answers, in order of MVT, shonky, thunderstick, ONLINE, REACT, RAAF, Haymarket, Grant, robbery, Klingenfuss.

Congratulations Mr Lim, you will have this fantastic rig delivered to you within the next few days.

THIS ISSUE'S PRIZE — A 27 MHz COBRA 148 GTL

Having read Ken Reynold's review of the COBRA 148GTL on pages 50/51 of this issue you now have the chance to win one courtesy of Hatadi Electronics Corporation . . . now this is what you call a really great prize.

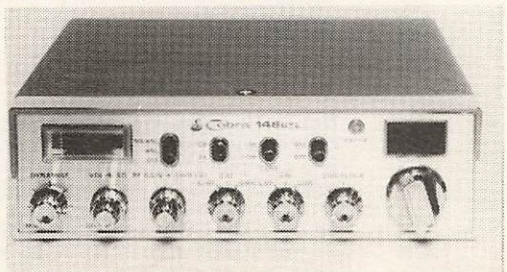
Although the Cobra has been around for a long time, Ken considers it to be "an industry standard" and the fact that it has remained on the market for so long is indicative of both its performance and popularity.

. . . . and it's all yours if you answer the questions correctly and get lucky when we pick the envelope out of the mailbag.

It will go to the first correct entry opened after 16 September.

You do, however, need to answer the following questions and circle them in the WORDMAZE.

1. What 27 MHz rig is considered by Ken Reynolds to be, "an industry standard" in this issue.
2. A paragraph in one story in this issued reads, "my own scanner is a modest but capable Cobra SR-15 and its hundred channel cup (next word ?) over . . . etc".
3. In our July/August issue of this year we made mention of a CB association which celebrated its 10th anniversary on May 26. What are the initials of that assocation?
4. Andrews Communications Systems have just opened a new store at Greystanes, NSW . . . what Victorian suburb is one of their other stores in . . . ?
5. What company (first word only) markets the Cobra 148GTL in Australia?
6. What is the name of the 'thing' which converts your unbalanced 50 ohm coaxial feedline to a balanced 50 ohm feedline?
7. One of our contributors tells readers where to obtain a free booklet dealing with the weather . . . what government bureau is this available from (one word only)?
8. There is a Q code which means to move to a different frequency- . . . what is that code (three letters only)?
9. Who (in this issue) say, "that the best form of defence is offence"?
10. One of our contributors in this issue is giving away a copy of Australian (missing word) Guide?



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| N | A | E | S | A | C | A | O | A | B | E | E | N | U | N | O | R | D | A | A |
| D | O | C | N | U | E | Y | S | Q | Q | B | R | I | A | A | C | A | R | S | T |
| A | E | E | I | T | A | O | Y | B | S | A | O | N | H | Q | S | Y | T | L | E |
| A | C | A | B | U | B | C | D | B | Y | L | R | A | N | O | D | T | E | N | Q |
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| Y | T | I | A | Q | A | A | A | R | O | A | S | A | O | C | O | N | I | A | D |
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| Q | Q | A | O | D | E | N | B | Y | Y | S | D | Y | I | S | T | R | O | W | O |
| H | D | A | H | Y | O | N | O | U | A | G | S | A | R | A | S | Y | O | G | Y |
| B | I | A | O | D | U | L | D | R | A | W | A | C | B | R | O | W | R | E | Y |
| S | A | E | N | N | I | S | B | O | A | C | Y | R | U | N | N | E | T | H | R |
| A | A | N | O | I | U | N | O | T | T | I | N | A | L | T | A | I | R | B | O |
| U | N | B | E | S | L | N | E | Y | C | L | A | E | R | Y | C | I | U | B | H |
| R | C | O | Q | I | O | R | B | U | Y | S | Y | A | B | B | H | U | R | N | I |

1 .....

2 .....

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10 .....

The answers to all of the above are to be found within either this or the previous issue.

NOTE: The correct answers MUST be circled in the WORDMAZE — photostat copies are acceptable HOWEVER only one per reader — if we find a reader sending in more than one photostat entry all that reader's entries will be excluded. You can of course send in as many entries as you like using the original page torn from the magazine . . . that way we get to sell more of 'em . . . !

The closing date is 16 September and the winner will be the first correct entry opened after that date. The draw will be conducted in the offices of CB Action and the results, answers and winner will be published in the next issue.

Entries should be addressed to: CB Action/Hatadi Electronics Corporation Wordmaze, PO Box 628E GPO, Melbourne 3001.

# AUSTRALIAN UHF CB REPEATER LIST

| AREA | CHANNEL |
|---|---|
| **ACT** | |
| Canberra | 2/32 |
| **New South Wales** | |
| Albury | 8/38 |
| Armidale | 6/36 |
| Bathurst | 4/34 |
| Bega | 8/38 |
| Belbora | 6/36 |
| Binya | 1/31 |
| Blue Mountains | 3/33 |
| Bombala | 2/32 |
| Booral | 8/38 |
| Bowral | 7/37 |
| Braidwood | 6/36 |
| Brewarrina | 3/33 |
| Brindabella Ranges | 1/31 |
| Broken Hill | 7/37 |
| Broken Hill | 4/34 |
| Buladelah | 7/37 |
| Casino | 7/37 |
| Cobar | 6/36 |
| Coffs Harbour | 8/38 |
| Coolah | 6/36 |
| Cooma | 6/36 |
| Coonabarabran | 4/34 |
| Corowa | 4/34 |
| Corowa | 2/32 |
| Corwa | 5/35 |
| Deepwater | 7/37 |
| Deniliquin | 5/35 |
| Dungog | 3/33 |
| Eden | 3/33 |
| Glen Innes | 2/32 |
| Grafton | 7/37 |
| Grenfell | 8/38 |
| Goulburn | 1/31 |
| Gundagai | 4/34 |
| Guyra | 7/37 |
| Warden | 1/31 |
| Hay | 1/31 |
| Inverell | 4/34 |
| Jindabyne | 2/32 |
| Junee | 1/31 |
| Lismore | 5/35 |
| Mururundi | 2/32 |
| Muswellbrook | 3/33 |
| Narrabri | 4/34 |
| Narranderra | 2/32 |
| Narromine | 8/38 |
| Narromine | 5/35 |
| Newcastle | 6/36 |
| Newcastle | 1/31 |
| Newcastle | 2/32 |
| Newcastle | 5/35 |
| Orange | 6/36 |
| Port Macquarie | 3/33 |
| Sydney (south) | 2/32 |
| Sydney (west) | 1/31 |
| Sydney (outer-west) | 3/33 |
| Sydney (north) | 4/34 |
| Tamworth | 7/37 |
| Tenterfield | 1/31 |
| Tumbarumba | 3/33 |
| Tumut | 3/33 |
| Tweeds Heads | 6/36 |
| Wagga Wagga | 4/34 |
| Wagga Wagga | 1/31 |
| Walbundrie | 5/35 |
| Walcha | 2/32 |
| Warrumbungles | 8/38 |
| Wingham | 1/31 |
| Wilcannia | 1/31 |
| Wollongong | 1/31 |
| **Northern Territory** | |
| Bushy Park | 8/38 |
| Darwin | 1/31 |
| Erlunda Station | 1/31 |
| Katherine | 3/33 |
| Maryvale Station | 2/32 |
| Mt Swan | 4/34 |
| **Queensland** | |
| Atherton | 2/32 |
| Amiens | 8/38 |
| Ayr | 8/38 |
| Barcaldine Downs | 3/33 |
| Bathurst Heads | 1/31 |
| Biloela | 1/31 |
| Brisbane | 7/37 |
| Brisbane | 1/31 |
| Brisbane | 5/35 |
| Bundaberg | 7/37 |
| Bundaberg | 1/31 |
| Caloundra | 4/34 |
| Chinchilla | 6/36 |
| Chinchilla | 3/33 |
| Clermont | 8/38 |
| Clermont | 6/36 |
| Crows Nest | 7/37 |
| Dimbulah | 6/36 |
| Dingo | 6/36 |
| Dirranbandi | 6/36 |
| Disraeli Mine | 8/38 |
| Drummond Range | 8/38 |
| Emerald | 2/32 |
| Miriam Vale | 8/38 |
| Gladstone | 2/32 |
| Goondiwindi | 6/36 |
| Gunalda | 4/34 |
| Double Island Point | 2/32 |
| Gympie | 3/33 |
| Gympie (portable) | 5/35 |
| Hayman Island | 7/37 |
| Pialba | 4/34 |
| Ingham | 8/38 |
| Inglewood | 2/32 |
| Innisfail | 1/31 |
| Ipswich | 1/31 |
| Jericho | 4/34 |
| Kilcoy | 4/34 |
| Lakeland | 3/33 |
| Longreach | 2/32 |
| Mackay | 3/33 |
| Mackay | 1/31 |
| Marlborough | 6/36 |
| Maryborough | 2/32 |
| Monto | 6/36 |
| Moranbah | 3/33 |
| Moura | 4/34 |
| Mt Isa | 1/31 |
| Mt Kynoch | 1/31 |
| Mundubbera | 2/32 |
| Murgon | 6/36 |
| Port Douglas | 7/37 |
| Quilpie | 6/36 |
| Rockhampton | 2/32 |
| Rockhampton | 1/31 |
| Roma | 4/34 |
| Springsure | 1/31 |
| Sunshine Coast | 3/33 |
| Sunshine Coast | 6/36 |
| Tambo | 8/38 |
| Taroom | 6/36 |
| Thargomindah | 2/32 |
| Toogoolawah | 6/36 |
| Toowoomba | 1/31 |
| Toowoomba | 2/32 |
| Townsville | 4/34 |
| Wavell Heights | 1/31 |
| Yaraka | 2/32 |
| **South Australia** | |
| Adelaide | 7/37 |
| Adelaide | 1/31 |
| Adelaide | 3/33 |
| Angaston | 5/35 |
| Blinman | 4/34 |
| Carrietown | 3/33 |
| Ceduna | 1/31 |
| Clare | 1/31 |
| Cleve | 7/37 |
| Coonalpyn | 2/32 |
| Coppudurba Hill | 6/36 |
| Hawker | 1/31 |
| Kangaroo Island | 7/37 |
| Manum | 4/34 |
| Mt Bryan | 8/38 |
| Mt Gambier | 8/38 |
| Mt Gambier | 5/35 |
| Myponga | 7/37 |
| Naracoorte | 2/32 |
| Orroroo | 4/34 |
| Port Lincoln | 2/32 |
| Port Pirie | 8/38 |
| Renmark | 4/34 |
| Snowtown | 6/36 |
| Tarcoola | 6/36 |
| Wilkatana | 6/36 |
| Yorketown | 8/38 |
| **Tasmania** | |
| Burnie | 7/37 |
| Central Highlands | 8/38 |
| Devonport | 7/37 |
| East Coast | 1/31 |
| Fingal | 6/36 |
| Hobart | 3/33 |
| Hobart | 1/31 |
| Launceston | 5/35 |
| Midlands | 2/32 |
| North East Coast | 4/34 |
| West Coast | 7/37 |
| **Victoria** | |
| Alexandra | 6/36 |
| Ballarat | 1/31 |
| Ballarat | 2/32 |
| Bairnsdale | 5/35 |
| Beech Forest | 7/37 |
| Bendigo | 3/33 |
| Cavendish | 4/34 |
| Currajung | 8/38 |
| Echuca | 4/34 |
| Euroa | 6/36 |
| Falls Creek | 3/33 |
| Foster | 3/33 |
| Geelong | 6/36 |
| Halls Gap | 4/34 |
| Hamilton | 6/36 |
| Harcourt | 5/35 |
| Hawkesdale | 8/38 |
| Horsham | 4/34 |
| Kerang | 3/33 |
| Mansfield | 2/32 |
| Melbourne (north) | 2/32 |
| Melbourne (metro) | 1/31 |
| Melbourne (metro) | 3/33 |
| Melbourne (south) | 5/35 |
| Mildura | 7/37 |
| Moe | 3/33 |
| Mornington Pen. | 2/32 |
| Mt Cann | 8/38 |
| Mt Concord | 8/38 |
| Mt Delegate | 6/36 |
| Mt Terrible | 3/33 |
| Myrtleford | 8/38 |
| Penshurst | 8/38 |
| Shepparton | 1/31 |
| St Arnaud | 7/37 |
| Swifts Creek | 1/31 |
| Talangatta | 1/31 |
| Wangarrata | 7/37 |
| Waubra | 6/36 |
| **West Australia** | |
| Albany | 7/37 |
| Albany | 2/32 |
| Augusta | 3/33 |
| Boyup Brook | 7/37 |
| Bunbury | 4/34 |
| Carnamah | 2/32 |
| Carnarvon | 2/32 |
| Coolgardie | 2/32 |
| Darkin | 7/37 |
| Denmark | 6/36 |
| Esperance | 1/31 |
| Kalgoorlie | 4/34 |
| Kambalda | 2/32 |
| Katanning | 1/31 |
| Kellerberrin | 1/31 |
| Kulin | 1/31 |
| Lancelin | 4/34 |
| Mandurah | 4/34 |
| Manjimup | 7/37 |
| Margaret River | 8/38 |
| Meekatharra | 6/36 |
| Merredin | 1/31 |
| Mia Mia | 2/32 |
| Manypeaks | 1/31 |
| Mt Barker | 6/36 |
| Mt Saddleback | 5/35 |
| Mt Solus | 1/31 |
| Nannup | 4/34 |
| Perth | 3/33 |
| Perth | 1/31 |
| Perth | 3/33 |
| Perth | 5/35 |
| Ravensthorpe | 8/38 |
| Stirling Ranges | 8/38 |
| Wickham | 7/37 |
| Wongan Hills | 1/31 |
| Wyalkatchem | 8/38 |
| York | 6/36 |

**Note: This list includes repeaters licenced but maybe not yet operational. It is compiled from various sources and relies upon reader input to remain accurate. Corrections and up/dates should be sent to: CBA Repeater Listing, PO Box E160, St James NSW 2000.**

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Signature .....

# AUSTRALIA'S CB SPECIALISTS